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ABSTRACT

The three papers which make up this report all deal with the potential impact on learning of investments in school resources: textbooks, school facilities, and teacher training. The first two papers use data from a longitudinal study of young people in Chile. The linkage between education and labor market entry is addressed in the first paper. These conclusions are drawn: educational variables are more powerful predictors of occupational attainment than family social status, and educational quality variables are much more powerful predictors of occupational attainment than educational attainment or achievement. The second paper examines factors that explain changes in academic achievement levels between the end of primary and the end of secondary school. It concludes that among the relatively small percentage of students who both completed secondary school and took the university entrance exam, changes in achievement levels are explained primarily by differences in the quality of the educational experience rather than in the differences in family background. Using data from a questionnaire observation study of actual teaching-learning behavior in Chilean classrooms, the third paper examines patterns of textbook use and concludes that teachers vary widely in attitudes toward and use of texts, that students have a much more positive perception of texts than do teachers, and that the main problems in textbook use are negative teacher attitudes and the inability of poorer children to buy them. (YLB)

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WORLD BANK STAFF WORKING PAPERS
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The Influence of School Resources in Chile
Their Effect on Educational Achievement and Occupational Attainment

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ABSTRACT

This report consists of three papers, all dealing with the potential impact of investments in school resources, such as textbooks, other teaching aids, school facilities, teacher training and re-training, etc. The first paper focuses upon occupational attainment, the second upon changes in academic achievement levels while students are still in school, and the third examines in detail patterns of utilization of one of the most ubiquitous school resources: textbooks. Taken as a set the three papers suggest the following propositions: (A) Investments in school quality are likely to have a substantial and positive impact both upon students' success in school and upon their success in the labor market. (B) If they are to have significant impact upon students from lower socio-economic strata, school quality improvements must start early in the educational process and be accompanied by attention to out-of-school problems, such as malnutrition. (C) The impact of such investments will be increased if they are preceded by careful studies of current attitudes toward and utilization of school resources, particularly among teachers.

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EXECUTIVE SUMMARY

The papers presented here focus upon three questions, each of which represents a gap in our understanding of the influence of school resources upon learning. (1) How are investments in improving school quality related to labour market entry? (2) How do school resources affect changes in cognitive achievement over time? (3) How are school resources actually used in classrooms? Answers to the first two questions are derived from further analysis, with World Bank support, of the data from an ongoing longitudinal study of young people in Chile. Data regarding the third question come from a questionnaire observation study, also partially supported by the Bank, of actual teaching-learning behaviour in Chilean classrooms, which was designed specifically to explore issues raised by the longitudinal study.

The most surprising and, perhaps, the most important conclusions are derived from the first paper. The fundamental question addressed by this paper is the role of education, both independently of and in interaction with other classes of variables, as a determinant of labour market entrance. Three aspects of "education" are examined: (1) educational attainment--years of schooling completed; (2) educational achievement--what students have learned; (3) educational quality--as measured, for example, by textbook availability, school facilities, teacher training, class size. Two general questions guided the analysis. What is the effect on occupational attainment of educational variables relative to family social status? What is the impact on occupational attainment of educational quality variables relative to that of the normally used quantitative educational indicators, attainment and achievement? Three general conclusions are drawn. (1) For both sexes, educational variables are more powerful predictors of occupational attainment than is family social status. This relationship is very pronounced among males and somewhat attenuated among females. (2) For females, educational attainment is more important than educational achievement; the latter has a negligible effect on occupational destination. Among males, the reverse is the case; educational achievement suppresses the relatively small effect of years of schooling, but it operates negatively in relation to level of first job. (3) For both sexes, educational quality variables are much more powerful predictors of occupational attainment than either educational attainment or educational achievement. This relationship is stronger among males than females.

Although the meaning of these findings for both theory and policy is not entirely clear, several lines of tentative explanation are advanced. Part of the explanation, and a limitation on the results, is the nature of the sample. All have completed primary education and none have completed university. One is dealing, then, with individuals possessing a relatively similar, and middle range, level of education, who are competing for middle-range positions in the labour market. Nevertheless, by expanding the concept of "education" beyond simply counting years in school by including measurements of school quality, cognitive achievement, exposure to non-formal education, and by extending the time horizon to include both elementary and secondary educational experience, this paper has been able to uncover powerful educational effects upon labor-market success which have generally been overlooked.

The second question is dealt with by examining factors which explain changes in achievement levels between the end of primary and the end of secondary school. The strongest conclusions are that: (1) Changes in achievement level are explained primarily by differences in the quality of the educational experience received rather than differences in family background; and (2) this relationship holds for both higher and lower SES students, although early severe malnutrition has a substantial and long-lasting negative effect upon achievement gains even among the academically most successful members of the lower SES group.

The third paper examines patterns of utilization of one of the most ubiquitous educational resources: textbooks. Principal conclusions are that: (1) Chilean teachers vary widely in their attitudes toward and use of texts, with most having a somewhat ambivalent, if not negative, attitude toward them, particularly in science classes; (2) students have a much more positive perception of texts than do teachers; and (3) the main problems in textbook utilization are negative teacher attitudes and the inability of the poorer children to buy them.

Taken as a set, the three papers suggest the following propositions: (A) Investments in school quality are likely to have a substantial and positive impact both upon students' success in school and upon their success in the labour market. (B) If they are to have significant impact upon lower SES students, school quality improvements must start early in the educational process and be accompanied by attention to out-of-school problems, such as malnutrition. (C) The impact of such investments will be increased if they are preceded by careful studies of current attitudes toward and utilization of school resources, particularly among teachers.

EDUCATION AND OCCUPATIONAL ATTAINMENT IN CHILE: THE EFFECTS OF EDUCATIONAL QUALITY, ATTAINMENT AND ACHIEVEMENT

Ernesto Schiefelbein and Joseph P. Farrell

In this paper, data from a longitudinal study of young people in Chile are used to examine the linkage between education and entrance to the labour market. The particular focus is the effect of education on the level of the first job obtained by a young person.

Although there have been several careful studies of the relationship between education and labour market entrance in developing nations reported in recent years (see, for example, Education Development Center, 1975; PREALC, 1978; Schiefelbein, 1978; Lin and Yauger, 1975; Holsinger, 1975; Currie, 1977; Heyneman, 1980) most of the available research, especially that in which an attempt is made to develop complex multi-variate models of the job attainment process, pertains to developed nations (see, for example, Fagerlind, 1975; Sewell and Hauser, 1975. Recent reviews of studies in this area can be found in Bowman, 1976, and Woodhall, 1979.) Additionally, previous studies of the education-labour market linkage have dealt almost exclusively with males, have been based with very rare exceptions (see Sewell and Hauser, 1975) on cross-sectional analysis, and have ordinarily considered only two, quantitative, educational indices: educational attainment, measured as years of schooling or highest schooling level completed, and/or educational achievement, measured as scores on a test or grades assigned by classroom teachers. More qualitative dimensions of the educational experience are typically ignored (exceptions are Currie's study of Uganda--Currie, 1974--Heyneman's study of Malawi--Heyneman, 1980--in which a limited indicator of schooling quality is employed, and of course Jencks' study of the U.S.--Jencks, 1979). With the information available from the study reported here we have been able to include both males and females in the analyses, and to bring longitudinal data to bear on the relationship between education (considered in both qualitative and quantitative terms) and occupational attainment. A particular focus of the analysis will be the relative importance of quantitative and qualitative aspects of the educational experience.

The Study

The data to be considered here are taken from an ongoing longitudinal study of a cohort of Chilean young people. The investigation began in 1970, when the subjects were in grade 8, the last year of primary school. Its original objective, as part of an effort to evaluate the effects of a massive reform of the educational system implemented between 1965 and 1970, was to identify the factors which most influenced performance on a national achievement test administered to all students at the end of primary education. To that end, questionnaires were administered to a random sample of ten students in each of 353 randomly selected 8th grade classrooms throughout the nation, to their teachers and the directors of their schools. Codeable data were received from 3,469 students, 2,340 teachers[1] and 353 school directors. Combining the questionnaire responses with the test results and other information routinely collected by the Ministry of Education's National Evaluation Service, produced, for each subject, more than 500 separate measures of characteristics of the students themselves, their classmates, their teachers, their schools, their families and their communities. These data form the baseline for the study.

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[1] There were a maximum of 11 teachers per class, one for each subject in the 8th grade curriculum. In many cases, one teacher taught two or more subjects to the same class.

These students completed primary schooling in December 1970, and those who continued in the educational system (in Chile almost all primary graduates enter secondary schooling) began secondary education in March of the following year. Near the end of the 1971 school year a follow-up study was undertaken, attempting to identify the type of secondary school in which the students had enrolled, and their academic success during the first post-primary year. Of the original cohort, 1,678 were relocated at this stage (for a variety of reasons, at this point in time it was difficult to locate students outside the two largest cities, Santiago and Valparaiso, where student records had been computerized).[2]

Those students who stayed in school and did not repeat a grade were in the last year of secondary in 1974. In that year an additional follow-up was undertaken. Using the records of the university admissions system it was possible to locate effectively all of the original cohort who were in the fourth year of secondary education. Questionnaires were again administered to students, their teachers and school directors. Of the original group, 1,369 were in the last year of secondary. Of these, 986 returned useable questionnaires, as did 684 teachers and 252 school directors.

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[2] In the later follow-ups, 1974 and 1977, it was possible to fill in the gaps in this 1971 sub-sample.

Finally, in 1977 another (and to this point in time the latest) attempt was made to contact the original subjects. Because most of them were out of school by 1977, and in a variety of life circumstances--working, unemployed but searching for work, undertaking non-formal education, housewives raising families, etc.--the process of locating individuals was extremely complex, involving teams of researchers working throughout the nation during a ten month period. The objective was to obtain interview data from a random sub-sample of approximately 1/3 of the original total sample. Eventually 1,205 were located and provided useable data on a complex interview/questionnaire instrument which included information on current family socio-economic status and living conditions, a year by year (1971-1976) history of all formal and non-formal educational experiences, and a complete history of all employment since 1970, focusing on characteristics of each job, job search behaviour and reasons for and the process of job change. Comparisons of the group located in 1977 with the full 1970 cohort indicate no significant sampling biases with respect to such variables as geographic distribution, family social economic status (SES) or sex.

Some Limitations

Three important limitations on the analyses reported below should be noted at the outset. When the sample for the 1977 follow-up was designed, it was assumed that most of those who were not in the last year of secondary in 1974 had either already dropped out of school or would soon do so, due to grade repetition. However, on analyzing the data we found that the young people in this sample displayed a remarkable degree of educational persistence, staying in school much longer than had been expected. This meant that we have found fewer cases in the occupational system than anticipated, and those with jobs have been working for a relatively short period of time.[3] This has produced two analytical problems. First, although we have more than 450 cases of individuals who have found work, which is a number sufficient to carry out most planned regression analyses (although, as will be noted with fewer predictor variables than one would have hoped to include) we have not been able to undertake many potentially instructive multi-variate cross-tabular analyses because of small cell size problems, especially when dividing the sample by sex.[4] Second, because most of the subjects have been in the labour market for a shorter period than anticipated, we have been unable to consider systematically patterns of job change and within-career mobility, as had originally been planned. Rather, we have had to concentrate on labour market entry, considering only the first job obtained. This may not be a serious limitation. Raczynski's work (1974) suggests that mobility within careers in Chile is rather limited (especially when using the broad occupational categories employed here). Thus, the first job may be a fairly good indicator of the level of occupation an individual will have throughout his/her life. In any event, an additional follow-up is planned for the mid-1980s, to examine within-career mobility.

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[3] Sewell and Hauser (1975) encountered a similar difficulty.

[4] The relatively small number of cases has also created the situation wherein, in several instances, even with relatively simple tables, statistical significance has not been achieved. In all cases, levels of statistical significance are reported. It should be noted that in those cases where "non-significant" results are reported, they can at least be taken as description of patterns of interaction within this sample, even if generalization may be risky.

Third, earnings data could not be used as an indicator of "success" in entering the labour market. Because of the extraordinarily high inflation rates suffered by Chile during most of the 1970s (close to 1,000 percent annually in 1973 and 1974, and still as high as 62 percent in 1977 even after draconian deflationary government economic policies) it was found to be impossible to obtain reliable retroactive salary information. Individuals could not be depended upon to accurately recall their salaries of even a short time before the administration of the questionnaires, let alone their earnings several years previously. Therefore, we could not acquire reliable data regarding the relative wages of individuals in the sample. Thus accurate coding of occupations, in order to fit them into a scale of occupational levels, became extremely important. To provide the most detailed possible characterization of each occupation, seven different questions were asked regarding the nature of each job. All of this information was considered in judging into which of the occupational categories used in the Chilean census a particular job best fit. The occupational codings were then carefully rechecked for accuracy and consistency.

The Labour Market

A few features of the Chilean labour market during the time when these young people began to search for jobs, which are necessary to interpret the data presented below, should also be noted. First, the Chilean economy is primarily industrial and urban based. In the 1960 census only about one-third of all economically active males were reported employed as agricultural labourers, a figure which had dropped to one-quarter by the early 1970s (Steenland, 1974, p.129). Second, throughout the 1970s Chile has experienced severe economic difficulties. Those of our sample who left school early, before 1974, entered the labour market at a time of great economic (as well as political and social) turmoil. The public sector expanded very rapidly owing to extensive nationalizations, the remaining private sector stagnated, work stoppages were endemic, a vast black market flourished, and inflation reached record annual rates of near 1,000 percent. A variety of arguments exist regarding the causes of these conditions; one consequence however was a very unstable employment market. Those who left school thereafter came into the employment market at a time when the "shock treatment" economic policies of the military government which had overthrown the Allende regime were producing a severe economic depression, one of whose results was a very high unemployment rate, especially among young people. The Office of National Planning (ODEPLAN) has estimated that in 1975 the open unemployment rate among Chileans aged 15 to 24 was

33.9 percent. Among those youths with three or fewer years of secondary education the figure was 31.4 percent; among those with four years of secondary schooling or more the rate was 24.8 percent (Acevedo, Marshall and Silva, 1977, p.17). While there has been some improvement since 1975, youth unemployment rates have remained unusually high.

Third, rates of female participation in the labour market in Chile are quite high, in relation to other developing societies, and even in comparison to most developed nations. (See Schiefelbein and Farrell, 1980.)[5] Consequently, any serious analysis of the relationship between education and labour market entrance in this society must include females and differentiate analyses by sex.

The Educational System

Several important characteristics of the Chilean educational system should also be kept in mind when interpreting the findings reported here. Structurally, the system consists of eight years of primary schooling, with an essentially identical curriculum for all students, and four years of secondary schooling. At the secondary level students may enter a Liceo, an academic, university-oriented, school, or one of a variety of technical-professional schools (which theoretically provide access to university as well, although a much smaller proportion of students from these schools make the transition to the next level). Almost all Chilean children enter the first grade of primary school. Approximately fifty percent of an entering grade one cohort can be expected to complete the full eight years of primary schooling. Although the evidence is not conclusive, it appears that most children complete four or five years of schooling, with the heaviest dropouts occurring after the sixth grade. As one might expect, survival to complete primary education is strongly associated with family social status. Nonetheless, a surprisingly high proportion of lower class children, particularly from the urban-industrial labouring class, complete primary school (Schiefelbein and Farrell 1978a and 1978b). One implication for the present study, which includes only youngsters who have at least completed primary schooling, is that we have a sufficient representation of lower status individuals in the sample to permit meaningful analysis by family social status.

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[5] For example, in the early 1970s, women comprised 32 percent of those with semi-professional or higher occupations, a participation rate considerably higher than in most developed or developing nations (Passow, et. al., 1976, p.182). The total labour force participation rate for all Chilean women aged 15-65 was 23.1 percent in 1970.

Almost all primary school completers enter secondary schooling, with the highest academic achievers ordinarily attending Liceos. Of those who enter secondary school, approximately 40 percent will finish the cycle. Detailed analyses of factors which predict achievement and survival patterns throughout primary and secondary schooling can be found in Schiefelbein and Farrell, 1974, 1978a, 1978b, 1979.

Type of First Job Found

Before examining predictors of occupational destinations among these young Chileans we must consider the distribution of the first jobs they acquired. Table 1 displays the distribution by job type or level of the first positions obtained by this sample, and compares it to the corresponding distributions among the economically active population aged 15 to 19 years, and the population of all ages but with one year of secondary education or more, from the census of 1970. Comparison of the last two columns shows that while almost 40 percent of youth aged 15 to 19 who had jobs worked as agricultural labourers in 1970, the proportion of individuals of all ages but with more than primary education in such jobs was very low (3.7 percent). The proportion with agricultural labouring jobs among our sample, all of whom are young, have at least some secondary education, and entered the labour market after 1970 (predominantly in the mid-1970s or thereafter) is even smaller (0.4 percent). Similarly, there is an under-representation of personal service positions, most of which tend to be low-pay, low-status jobs (e.g., domestic labour, barbering and hairdressing). Given that none of the individuals in our sample had completed university studies, it is reasonable that there would be an under-representation of professionals and technicians, positions which normally require some form of post-secondary education (2.9 percent vs. 15.5 percent of the total population with more than primary education). Given that our sample are all young, it is similarly not surprising that there is an under-representation of

Table 1

COMPARISON OF FIRST JOB TYPES BETWEEN THE 1978 SAMPLE AND THE CORRESPONDING GENERAL POPULATION

Type of Occupation	1978 Sample			Economically Active Population 1970	
	Men %	Women %	Total Sample %	15-19 years old[a] %	with secondary education or more[b] %
Professional & Technicians	5.6	3.4	2.9	0.6	15.5
Managers & Administrators			1.3	0.0	3.6
Office Workers	39.4	65.2	39.2	3.8	23.1
Sales Personnel			13.2	6.8	9.3
Agricultural Labourers			0.4	39.2	3.7
Transportation Workers	55.0	31.3	1.1	1.5	4.4
Artesans & Skilled Tradesmen			13.9	20.5	14.5
Other Labourers			19.7	8.8	5.9
Personal Service Workers			8.1	25.0	20.0

[a] Source: *Características básicas de la población (Censo 1970)*. Santiago: Instituto Nacional de Estadísticas, 1970, Table 16.

[b] Source: *Población, total país. Resultados definitivos del XIV Censo de población 1970*. Santiago: Instituto Nacional de Estadísticas, 1978, Table 32.

individuals working as managers and administrators (1.3 percent vs. 3.6 percent). Conversely, there is a substantial over-representation in such lower level white collar jobs as selling and office work.

One also notes a substantial differentiation by sex. A much higher proportion of women than men obtained first jobs in sales and office work, while a higher proportion of men obtained labouring jobs. Slightly more than half of the working females were in the service sector, compared to one-third of the males.[6]

Since all individuals in this sample, however many years of education they may have completed since 1970, were in eighth grade that year, these figures give us a vision of the effect of having completed a primary education on the occupational destiny of Chilean young people. Being one of that half of an entering grade one cohort who complete[7] eight years of primary schooling appears to be a very important factor in determining how one will enter the labour market. It seems to provide a floor under the level of the initial job (i.e., primary graduates rarely become agricultural labourers) and greatly increases the probability of obtaining a white collar position. Below we will consider the effect on level of first job of different levels of education above primary schooling.

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[6] We can also note that the large majority of these first jobs are full-time positions. Respondents who had jobs were asked what hours they worked during the day (only mornings, only afternoons, morning and afternoon, evening, in shifts, etc.) and how many hours they worked per week. 76.6 percent worked both morning and afternoon, with another 8.2 percent on shift work. Only 18.6 percent worked 30 or fewer hours per week.

[7] Only 1.9 percent of our original eighth grade sample did not complete the eighth grade.

This pattern of job distribution suggests one very important observation regarding how one understands the results reported here in a comparative perspective. Our focus throughout this analysis is on the type of first job acquired, and the relationship of education to different levels of labour market entry. A primary concern is the independent effect of educational variables on occupational mobility. This is a relevant focus here because: (1) given Chile's level of development and the nature of its economy there are a wide variety of types and levels of occupations potentially open to any young person; and (2) although educational survival and achievement levels are clearly class biased, several years of primary education are available to almost all children, and significant proportions of all but the poorest children in the society achieve relatively high levels of education.[8]

In many developing nations, particularly the poorest, these conditions obviously do not obtain. In such nations most children are the offspring of agricultural labourers (whether landless or landowning) and will themselves become agricultural labourers. The 38 lowest income nations in the world in 1980 had an average of 21 percent of their population in urban areas; among the 52 "middle income" nations only six exceeded Chile's degree of urbanization of the population--81 percent (World Bank, 1980, Table 20). Moreover a few years of very rudimentary primary schooling is the maximum that most such children will ever attain, with many never entering a school. For such populations, the effect of education on job level, or occupational mobility potential, is not a relevant question. The economic question is rather whether a few years of education is likely to make them more efficient or productive farmers. Evidence which has recently been assembled suggests strongly that even a few years of primary schooling significantly increases the productivity and/or efficiency of poor farmers (Jamieson and Lau, 1978, Chapter 2, and Schultz, 1979).

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[8] In the epoch considered here, approximately 50 percent of an entering grade one cohort could be expected to complete primary school, with most dropping out in grades 7 and 8, and 20 percent could be expected to complete secondary school (Schiefelbein and Farrell, 1978a).

What is particularly interesting with reference to the Chilean case, wherein almost all of that 40 percent of the youth population who became agricultural labourers (and who are not in our sample) had at least four to six years of primary schooling, are the findings that: (1) 4-6 years of schooling seems to be a threshold level above which the effect of education on agricultural productivity is most pronounced, and (2) education has a higher payoff for farmers in the more advanced, modernizing, poor societies, such as Chile (Jamieson and Lau, 1978, Chapter 2). In this context the problem dealt with in this paper may be phrased as follows: given that the approximately 4-6 years of primary schooling they have received probably has a positive economic effect on those Chilean youngsters who remain as agricultural labourers, what is the economic effect of education on those young people who have achieved higher levels of schooling and for whom occupational mobility is a viable possibility? In considering this question we will be examining three distinct dimensions of "education": (1) educational attainment--number of years of schooling acquired; (2) educational achievement--what students have learned; and (3) the quality of the schooling received.[9]

Some Individual Predictors

What factors, then, best predict the level of the first job obtained? To answer this question several key predictor variables will be considered individually, followed by multi-variate analyses.

Given the relatively small size of our sample of individuals with first jobs, to which we have referred earlier, and the fact that there is a very small representation in this sample of both the highest level positions (professionals, technicians, managers and administrators) and the lowest level jobs (agricultural labourers, personal service workers), in the cross-tabular analyses which follow occupational level is dichotomized into "high" and "low". "High" includes professionals and technicians, managers and administrators, office workers and sales personnel. "Low" includes the remaining occupations. This corresponds to the traditionally used distinction between non-manual and manual jobs.

We first consider two indicators of family socio-economic status.[10] There is a strong relationship between the level of a father's job and the level of the first job obtained by the child (Gamma = .45).[11] The data are found in Table 2. Nonetheless, there appears to be a substantial amount of intergenerational mobility among these primary school graduates. Of those whose fathers have low level jobs, fully 45.2 percent themselves acquired high level jobs when they entered the labour force. There is also a suggestion of considerable downward mobility. Almost one third of children of fathers with high level jobs

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[9] We are indebted to Stephen Heyneman for suggesting the potential utility of this three-fold distinction for the analysis of the data reported here.

[10] Throughout the analyses in earlier stages of this study, factor analyses have shown these two measures to be the best indicators of family SES available to us. Father's education is the single best measure. Father's occupation is used here as well to deal directly with the problem of intergenerational occupational mobility.

Table 2

LEVEL OF FIRST JOB BY LEVEL OF FATHER'S JOB

Respondent's First Job Level	Father's Job Level		
	High	Low	
High	54.8% 142 68.6%	45.2% 117 45.2%	259
Low	31.4% 65 31.4%	68.6% 142 54.8%	207
	207	259	sig. >.001

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[11] Gamma is a measure of the strength of association between two ordinal variables.

had low level first jobs. This observation must be treated with some caution, however, since at least some of these low level first jobs may reflect the pattern of middle or upper class young people starting at a low level job in the family business, or a related enterprise, in order to gain experience before assuming their "rightful" position. Some could also represent temporary positions taken to earn money for further studies or personal pleasure. At the same time, it may well be the case that the difficult economic circumstances within Chile during this time period have meant that some children of middle and upper class families, especially (given the nature of this sample) those who have not been able to enter and/or complete university, have had to lower their aspirations and accept whatever jobs they can find, even if they are of lower status than those held by their father.

Father's education is another key indicator of family status. The relationship of this variable to level of first job is seen in Table 3. The relationship is similar to that observed in the previous table. 56.1 percent of the young people whose fathers had primary education or less obtained low level first jobs, while almost three quarters of those whose fathers had university education got high level jobs. For both of these SES variables the relationship with occupational attainment is slightly stronger among females than among males, but the differences are not great (e.g., for father's education Gamma = .51 for females vs. .42 for males).

Table 3

LEVEL OF FIRST JOB BY FATHER'S EDUCATION

Respondent's First Job Level	Father's Education			
	Primary or Less	Secondary	University	
High	42.7% 111 43.9%	41.5% 108 67.9%	15.8% 41 73.2%	260
Low	68.3% 142 56.1%	24.5% 51 32.1%	7.2% 15 26.8%	208
	253	159	56	

We have already noted that having acquired at least a complete eight year primary education appears to have considerable effect upon the type of first job a young person gets. Here we will consider the effect of education beyond the primary level. Two indicators will be used: duration of studies, as indexed by the calendar year in which an individual definitively left school; and level of schooling reached. Table 4 presents the data with respect to duration of studies, dividing the sample into

Table 4

LEVEL OF FIRST JOB BY YEAR LEFT SCHOOL AND SEX

Year Left School	Level of First Job							
	Males				Females			
	High		Low		High		Low	
	N	%	N	%	N	%	N	%
1973 or Before	11	30.6	25	69.4	14	40.0	21	60.0
1974 or Later	60	49.6	61	50.4	108	73.5	39	26.5

sig. > .05 sig. >.001

those who left school in 1973 or earlier (and thus could not possibly have completed secondary schooling), and those who left in 1974 or thereafter. For the total population and for each sex there is a strong relationship between duration of schooling and first job level. In all cases, the probability of obtaining a high level first job is substantially greater among those who stayed in school longer. the relationship is stronger among women than men (Gamma = .36 vs. .26). Indeed, one can note that among women who definitively did not complete secondary schooling (who left before 1974) 60 percent had low level (i.e., manual) jobs, a figure which is only 9.4 percent lower than that for men with the same number of years of schooling, and higher than the overall figure for men (which is 55 percent). That is, a woman who drops out early in secondary has about as great a probability of becoming a manual worker as does a man who drops out early, and a greater probability than male primary graduates overall. This reinforces the suggestion made in an earlier article that relatively higher levels of education are required for women to acquire those occupational roles socially defined as appropriate for them, (Schiefelbein and Farrell, 1980) and may help to explain a tendency for females to stay in school longer than do males.[12]

Table 5

LEVEL OF FIRST JOB BY EDUCATION ATTAINED AND SEX

Education Attained	Level of First Job							
	Males				Females			
	High		Low		High		Low	
	N	%	N	%	N	%	N	%
Incomplete Secondary	29	28.4	73	71.6	33	45.8	39	54.2
Complete Secondary	53	58.9	37	41.1	99	78.0	28	22.0
Incomplete University	22	61.1	14	38.9	22	78.6	6	21.4
	sig. > .001				sig. > .001			

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[12] It is also the case that jobs available to females with lower levels of education pay less well than those available to males. Thus, the income foregone in order to continue studying is less for a woman. See Morales, Schiefelbein and Rodriguez (1977).

Table 5 displays the relationship of first job level with the level of schooling acquired, categorized as incomplete secondary, complete secondary and incomplete university.[13] For both sexes, the probability of acquiring a high level first job is considerably higher among those who have completed secondary schooling than among those who entered the labour market with an incomplete secondary education. For neither sex does an incomplete university education provide an advantage over having a complete secondary education. Here we see the effect of "certification"--the importance of the degree itself as an "entry ticket" to higher levels of the employment market. Thus, entering university is likely to pay off for a student in terms of access to higher levels of the occupational structure only if the probability is high that the student will complete the course of studies and receive the degree.[14]

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[13] Since this analysis considers only those who had definitively left school at the time of the contact with them in 1977, none of the sample would have completed university and entered the labour market with their degree.

[14] Evidence from a 1970 survey of occupations and earnings in Greater Santiago indicates that among young people ages 20 to 24 (the age range which includes almost all subjects in our sample) the earnings of those with one or two years of university were less than the earnings of those who had completed secondary schooling but not continued their studies. However, for older age groups (up to age 60) incomplete university did produce higher earnings than complete secondary schooling (Schiefelbein, 1976, p.236).

Table 6

LEVEL OF FIRST JOB BY LEVEL OF OCCUPATIONAL ASPIRATIONS

Level of Occupational Aspirations	Level of First Job			
	High		Low	
	N	%	N	%
High	228	64.0	127	35.8
Low	17	21.5	62	78.5
			sig.	.001

We turn next to the relationship between occupational aspirations[15] for 1983 and the level of the first job (see Table 6). The relationship is very strong (Gamma = .74). Although we assume here that aspirations precede employment, there is no way of telling conclusively which way the causation runs. Those in high level jobs may get them because they have high aspirations, or they may have high aspirations because they are in high level jobs (not wanting to be de-classed). Or it may be that both aspiration level and job level are mutually reinforcing products of antecedent social and/or educational factors (aspiration level is associated with father's education: Gamma = .38).

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[15] The occupations respondents indicated they would like to have in 1983 were coded into the same census categories used for classifying the first jobs, and have been dichotomized in the same way.

Given that technical-professional schools (as compared to academically oriented Liceos) are, as in most nations, destinations for the academically less successful students, and that they have higher dropout and repetition rates than Liceos, we would expect to find a relationship between the kind of secondary school attended and the level of the first job. Such a relationship exists. More than two-thirds of those who attended Liceos have high level jobs, while less than half of those who attended technical-professional schools have high level jobs (Gamma = .42). This may, however, be a spurious relationship. Evidence presented elsewhere (Schiefelbein and Farrell, 1979, Chapter 4) shows that family social status is an important predictor (though not the most powerful) of the type of secondary school a student will enter.

We have collected detailed data regarding all non-formal educational experiences which the respondents had undertaken. Based upon information provided regarding the nature of each non-formal experience, and replies to a question regarding why a non-formal course was taken, the courses have been classified as being related to work or not so related. Our main interest here is those courses which were related to work. Since few respondents had taken more than one such course, they were classified as having had no such non-formal experience, or one or more such experiences. There is a relationship between having had a non-formal educational experience related to work and first job level

(Gamma = .19). This too could be a spurious relationship with participation in non-formal courses related to family SES. However, there is no relationship between the educational level of the respondent's father and the propensity to take non-formal courses related to work (Gamma = .02). There is, nonetheless, a relationship between secondary school type and such non-formal experiences (Gamma = .22). Therefore, we have controlled the original relationship by school type. The results are found in Table 7. Here we observe a remarkable interaction. Among those who attended _Liceos_, those who had work-related non-formal education are more likely to be in _high level_ jobs. Among students who attended technical-professional schools, those who had such non-formal courses are more likely to be in _low level jobs_. Indeed, the relationship between non-formal education and first job level is _positive_ among _Liceo_ students (Gamma = .34) and almost equally strongly _negative_ among technical-professional students (Gamma = .27).

This suggests a very interesting hypothesis: non-formal courses related to work reinforce already determined tendencies to end up in a given job type. Students select work-related non-formal courses in relation to the type of job they expect to acquire. _Liceo_ students, expecting to get high level jobs, take non-formal courses which increase their probability of acquiring such positions. Conversely, technical-professional students select non-formal courses which will increase their probability of getting low level jobs to which they have already

Table 7

LEVEL OF FIRST JOB BY TYPE OF SECONDARY SCHOOL AND NUMBER OF NON-FORMAL COURSES RELATED TO WORK

Type of School	Non-Formal Courses	Level of First Job			
		High		Low	
		N	%	N	%
Liceo	Total	158	68.7	72	31.3
	0 Courses	94	63.5	54	36.5
	1+ Courses	64	78.1	18	21.9
Technical Professional	Total	49	47.1	55	52.9
	0 Courses	39	50.6	38	49.4
	1+ Courses	10	37.0	17	63.0

sig. > .001

been oriented. Since family social status is not related to propensity to take non-formal courses related to work we may be observing here an unexpected intervening effect of education on labour market entry.

Multivariate Analysis

The simple relationships reported above demonstrate that several of the variables most commonly found to influence occupational attainment in industrial societies appear to be important in Chile, such as family

SES, educational attainment, occupational aspirations. We have also observed a peculiar relationship between two more qualitative educational indicators, secondary school type and non-formal courses related to work. What is of course of greatest interest is to evaluate the relative strength of these various indicators, and others, as predictors of occupational attainment. Two questions are of particular interest comparatively:

1. What is the effect of education relative to family SES? This question has been the focus of an enormous amount of debate during the past decade, and is very important both theoretically and in terms of policy as it deals with the ability, in a situation of general structural inequality, to use educational policy measures to solve basic social distribution problems. Lin and Yauger's comparative study (1975), particularly as supplemented by Schiefelbein and Farrell (1978a), has greatly increased our understanding of this very complex relationship. However, we still have much to learn.
2. What is the impact upon occupational attainment of qualitative educational factors relative to the normally used quantitative educational indicators, educational attainment and achievement? Much less is known with respect to this question, which is extremely important in policy terms. We do not invest directly in educational attainment or educational achievement. Rather, we invest in qualitative inputs to the educational process

(building schools, training and then paying teachers and other functionaries, buying books and supplies, etc.) which have a presumed relationship to such educational "results" as years of schooling attained and levels of learning, which in turn have an observed relationship with labour market entry. We have tended in the past to treat these more qualitative aspects of the educational system, which are the direct objects of educational investment, as a "black box". A major objective of this study is to open that box to the light of analysis, by separating the effects of qualitative and quantitative educational indicators.

To deal with these questions we use standard multiple regression analysis, supplemented by commonality analysis to minimize problems of interpretation arising from multi-collinearity, which are common in data such as these. This technique was originally developed by Wisler (1970) for use in the re-analyses of the "Coleman study" data carried out by Mayeske et al. (1970). In commonality analysis the explained variance in a regression is disaggregated into "unique" effects--that portion accounted for independently by each variable or variable set--and "joint" effects--that portion accounted for by each possible combination of variables or variable sets. (See also Newton and Spurrell, 1967, Roseboom, 1968 and Farrell, 1980.) It has since been used in several of the analyses of IEA data.

For these regression analyses, the occupational codings have been regrouped into five ordered categories: (1) agricultural labourers;

(2) other workers, transportation workers and personal service workers; (3) artisans and skilled tradesmen; (4) office workers and sales personnel; and (5) professionals, technicians, managers and administrators.[16] Given relatively small sample sizes for males and females separately, many of the variables in the regression equations do not have statistically significant individual regression weights, although the overall equations reported are statistically significant. For both males and females the variables included in the equations presented have been selected on the basis of preliminary screening to identify the potentially most powerful predictors, and to eliminate predictors which are very highly intercorrelated with other predictors.

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[16] Use of such a set of ordered categories as the dependent variable assumes of course, strictly speaking, that the "true occupational distance" between each set of adjacent categories is approximately the same; that is, that we have an equal-interval scale. The groupings used here, and the score assigned to each group, are based upon our own judgements regarding the relative "prestige" of various occupations in Chile--they correspond reasonably well to a scale of occupational prestige in Chile developed by Bucknam (1971) on the basis of questionnaire responses from secondary school students--and considerable experience working with Chilean economic and earnings data. We believe that the category scores do not seriously violate the "equal interval" assumption. One might wish to check this by calculating the mean earnings for each occupational group, if reliable data were available. A difficulty with this approach is that even such mean income figures might be distorted by precisely the same economic phenomena which made it impossible for us to collect individual earnings information. In any event, Labovitz demonstrated some time ago that unless one has an extremely stretched or skewed underlying distribution, regression analysis is quite robust to the assignment of numbers to rank ordered categories (Labovitz, 1970).

Table 8

REGRESSION, WITH COMMONALITY ANALYSIS, ON LEVEL OF FIRST OCCUPATION. MALES

I. Commonality Analysis[1]	% of Total Variance (Total $R^2=.368$)	% of Explained Variance
Unique Effects		
A. Personal Characteristics	.059	16.0%
B. Family and Community Characteristics	.007	1.9%
C. Educational Attainment	.009	2.4%
D. Educational Quality	.088	23.9%
Joint Effects		
AB	.005	1.4%
AC	.018	4.9%
AD	.007	1.9%
BC	.002	0.5%
BD	.043	11.7%
CD	.025	6.8%
ABC	.002	0.5%
ABD	.013	3.5%
ACD	.022	6.0%
BCD	.032	8.7%
ABCD	.036	9.8%

II. Regression Equation: Predictors in Order of Regression Weights

Variables[2]	Beta
Occupational aspirations	.270**
Number of non-formal courses not related to work	.180**
School type, 1971	.144**
Pedagogical excellence of 8th grade school	.142**
Last school year entered or completed	.122**
Father's education	.086
Text availability secondary	.061
Lived in city or country when young	.037
8th grade class size	.025
8th grade test score class average	-.011

**sig. > .01 Total equation sig. > .01 N = 213

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[1] Personal Characteristics: occupational aspirations
Family and Community Characteristics: education of father; lived in city or country when young
Educational Attainment: last school year entered or completed
Educational Quality: Number of non-formal courses not related to work; school type 1971; Pedagogical excellence of 8th grade school; text availability secondary level; 8th grade class size; 8th grade test score class average.

[2] A complete listing and description of the variables used in this and other tables reported here is found in Appendix 1. The basic correlation matrix is found in Appendix 2.

Males

Table 8 presents the results using the ten best predictors of occupational attainment among males. Together these variables explain 36.8 percent of the total variance in occupational level. Considering the individual regression weights, the most powerful single predictor is occupational aspiration, followed by number of non-formal courses not related to work,[17] school type in 1971, pedagogical excellence of the eighth grade school, and years of educational attainment. Of particular note is the fact that father's education and the nature of the community in which the young man grew up are relatively weak independent predictors. Moreover, several qualitative educational variables are more powerful predictors than is years of education attained.

The results of the commonality analysis are very instructive. Family and community characteristics (essentially SES) have by far the lowest unique effect upon occupational attainment, accounting for only 1.5 percent of the explained variance.

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[17] Results noted above indicate that non-formal courses related to work have a very complicated relationship with occupational attainment, which probably explains why that variable did not survive preliminary screening. The number of non-formal courses not related to work (the variable included in this regression analysis) likely reflects the availability of, and tendency to utilize, generally educative community facilities.

The five educational quality variables[18] have a very powerful unique effect, accounting for 23.9 percent of the explained variance, while educational attainment has a very small unique effect. Occupational aspirations also have a powerful unique effect upon first job level.

Several of the joint effects of variable sets also have a notable effect on occupational attainment. The joint effect of family and community characteristics and the educational quality variables (BD) accounts for 11.7 percent of the explained variance. This suggests that for this group of young men, SES affects occupational destination not directly, but indirectly through its influence on the availability to the student of quality education. The two three-way joint effects of educational attainment and educational quality with occupational aspirations (ACD) and with family and community characteristics (BCD) also account for significant proportions of the explained variance.

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[18] It is important to note here that these five educational quality variables have not been selected arbitrarily. The available data from the several phases of the study provide us with a very large number of indicators of educational quality--well over 100 major variables, plus many subvariables. These of course are only one part of the overall variable set (from the original 1970 study alone we have more than 500 separate indicators for each student). To reduce this mass of information to a conceptually and computationally manageable size, we have; for every phase of the analysis and for every variable set, followed a lengthy screening process to come to a limited number of potentially important predictors. This involves examining large preliminary correlation matrices, many cross-tabulations, and preliminary analytic runs, to select for the final analysis a limited number of variables which have the strongest simple associations with the "result" in question, and which are not extremely highly correlated with other potential predictors. These five variables, then, are the "survivors" of a lengthy pre-selection procedure.

In summary, these data provide very strong answers to the two general questions posed above. (1) The effect of family status on occupational destinations is quite low relative to the other classes of variables. Among this group of Chilean young men family background does not have a strong independent effect on occupational attainment.[19] (2) Educational quality variables are much more powerful predictors of occupational attainment than years of schooling attained (group D accounting for almost ten times as much of the explained variance as does group C). As we expand our conception of "education" beyond simply counting years of schooling completed, including measures of school quality, widening the range of educational experience to include non-formal education, and pushing the time horizon back to cover primary education we uncover very powerful educational effects on labour market entry which have previously been generally overlooked. This suggests a major weakness in those many studies of occupational attainment which have used years of schooling as the only measure of education's effect on the occupational destiny of students.

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[19] It may be thought that this low predictive power of family SES is partially due to the fact that the range on SES is limited by the study design. While it is true that this sample includes only those children of lower status families who have managed to complete at least primary schooling, the study design also restricts the range of variation on other predictors, particularly educational attainment. No one in this sample has less than eight years of primary education, and none have completed university. Thus, this argument cannot account for the low effect of family status relative to such variables as educational attainment.

Table 9

REGRESSION, WITH COMMONALITY ANALYSIS, ON LEVEL OF FIRST OCCUPATION: FEMALES

I. Commonality Analysis[1]	% of Total Variance (Total $R^2=.364$)	% of Explained Variance
Unique Effects		
A. Personal Characteristics	.026	7.1%
B. Family and Community Characteristics	.091	25.0%
C. Educational Attainment	.043	11.8%
D. Educational Quality	.070	19.2%
Joint Effects		
AB	.000	-
AC	.022	6.0%
AD	.010	2.7%
BC	.008	2.2%
BD	.032	8.8%
CD	.008	2.2%
ABC	.000	-
ABD	.000	-
ACD	.006	1.6%
BCD	.042	11.5%
ABCD	.006	1.6%

II. Regression equation: predictors in order of regression weight.

Variables[2]	Beta
Availability of TV in home	.275**
Last school year entered or completed	.265**
School type 1971	.245**
Occupational aspirations	.138*
Pedagogical excellence of 8th grade school	.119
Lives with spouse	-.107
Lived in city or country when young	.093
Pre-service training 8th grade teachers	.061
Father's education	.048
Text availability secondary level	-.022

**sig. > .01 *sig. > .05 Total equation sig. > .01 N = 208

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[1] Personal Characteristics: occupational aspirations; lives with spouse
Family and Community Characteristics: availability of TV in home; father's education; lived in city or country when young
Educational Attainment: last school year entered or completed
Educational Quality: pre-service training of 8th grade teachers; text availability secondary level. School type 1971; pedagogical excellence of the 8th grade school.

[2] A complete listing and description of the variables used in this and other tables reported here is found in Appendix 1. The basic correlation matrix is found in Appendix 2.

Females

It is quite clear that the factors affecting the occupational destinations of women are quite different from those operating among men. Table 9 presents the regression and commonality results using the ten best predictors for women. Not only is the variable set different, but the order of importance of common individual variables, and of the variable groups, differs between sexes. This equation explains the same amount of total variance in occupational levels as does the equation for men.

The most powerful individual predictor is availability of TV in the home. This variable had no important effect upon occupational level among men (not having survived the preliminary screening). It is also a difficult variable to interpret. Although it is related to other measures of family status it is not strongly associated with them, and in many of the analyses carried out in previous stages of this study, it has behaved, as a predictor, differently from them, as is the case in this analysis. We have classified it under family and community characteristics, but the availability of TV might also be considered as indexing the presence of a powerful informal educational medium. Length of schooling, which was a less important predictor among males, is the second most powerful variable, followed by school type, which is also the third most important predictor for men. Occupational aspirations are less important among women, as is the pedagogical excellence of the eighth grade school.

Living with a spouse, which has no effect upon male occupational destinations, is the next best individual predictor. Curiously, although women who are married are less likely to be employed (see Schiefelbein and Farrell, 1980), the sign of the regression coefficient indicates that married women are more likely than are single women to have a higher level occupation. Father's education is even less important among women than among men.

In the commonality analysis, family and community characteristics have the strongest unique effect (they are weakest for men). This is clearly, however, primarily the result of the influence of TV availability. When this variable is removed from the equation, the percentage of explained variance uniquely accounted for by this group falls from 25.0 percent to 8.7 percent. The next most powerful group is educational quality, uniquely accounting for 19.2 percent of the explained variance. Educational attainment is, uniquely, considerably more important among women than men, although in both cases educational quality is more important than educational attainment. Occupational aspirations are markedly less important for women.

Considering joint effects, that between family and community characteristics and educational quality variables (joint effect BD) has an important effect on occupational destination, as does the joint effect of personal characteristics and educational attainment (AC). The three-way joint effect among family and community characteristics, educational attainment and educational quality (BCD) also accounts for a significant proportion (11.5 percent) of the explained variance.

Although the patterns are not quite so sharp as they are among men, these female data also shed important light on our two general questions. (1) The effect of family status (especially as it is captured by TV availability--if that is an appropriate categorization) is much stronger among women than men. It is a more powerful predictor set than either educational attainment or educational quality. However, the combined unique effects of the two educational dimensions (accounting for 31.0 percent of the explained variance) is greater than the unique effect of family and community characteristics. This pattern would be even more pronounced if the troublesome TV availability variable were removed, leaving group B with the two more traditional family status indicators. (2) Educational attainment has a more pronounced impact upon occupational destinations of women than men. Nonetheless, here too the educational quality indicators have a markedly stronger unique effect than does educational attainment.

The comparison of the female and male results reinforce an argument we have developed elsewhere in detail (Schiefelbein and Farrell, 1980).[20] The labour market for women in Chile appears to be much more socially predetermined than that for men, in the sense that there is a more limited range of occupations considered "socially appropriate" for educated women. Moreover, educational credentials are more important for women than for men in competition for the same types of jobs. (Tables 5 and 6 above illustrate this difference.) These factors would explain the lesser importance of occupational aspirations among women (the range of their aspirations being limited) and the greater importance of educational attainment.

A Note on the Effect of Educational Achievement

As we have indicated above, in addition to educational attainment, educational achievement is the other educational indicator which has frequently been used in studies of occupational attainment. In order to test the effect of educational achievement we added the "individual eighth grade test score" to each of the regression equations reported in Tables 8 and 9.[21] This new variable was treated separately for commonality analysis, producing a five-group analysis.[22]

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[20] The careful reader will note some differences between the regression results reported in that earlier article and those reported here. Before undertaking the re-analyses required for the present paper, the data files were transferred to a new machine, whose software provided a more satisfactory means of dealing with missing values and separating zeroes and blanks on some key variables. This has allowed us to include more cases, with complete data sets. The main resulting differences are: (1) the equations reported here explain more of the total variance in occupational attainment; (2) the relative power of some individual predictors has been somewhat altered. However, the general patterning of the results, particularly in commonality analysis, and the conclusions derived from them, have not changed.

Among females, educational achievement has essentially no net effect at all upon occupational destination. In the regression it is the eighth of eleven predictors in order of size of regression coefficient. Its unique effect in commonality analysis is very small, accounting for only 0.9 percent of the explained variance, and its presence does not alter either the total variance explained or the patterning of the results related to the other variables as reported in the unique effects section of Table 9. It does have a significant impact jointly with family and community characteristics and educational attainment (jointly accounting for 15.0 percent of the explained variance). This likely reflects the fact, as reported elsewhere, (Schiefelbein and Farrell, 1978b) that individual achievement at the eighth grade level and family SES are the two most powerful predictors of survival to the end of secondary schooling, which has a stronger effect on labour market entry among women than men. Thus it would appear that for young women academic achievement does not directly affect job destination, but operates indirectly, in conjunction with SES, in influencing educational attainment.

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[21] For males the variable "eighth grade test score class average" was removed from the equation, as it has a very strong correlation with individual achievement, which could have produced insurmountable multi-collinearity problems.

[22] Given the complexity of these results--with a five-group commonality analysis there are 26 separate joint effects--the tables are not presented here. The salient findings are discussed in text.

Among males the effect of educational achievement is more pronounced, but it operates in a somewhat puzzling fashion. Inclusion of this variable increases the predictive power of the total equation (total $R^2 = .448$). The relative power of unique effects of educational quality, personal characteristics and family and community characteristics, is not altered. However, the unique effect of educational achievement (accounting for 7.1 percent of the explained variance) effectively eliminates the unique effect of educational attainment (now accounting for only 0.06 percent of explained variance). While both educational achievement and attainment are much less powerful predictors than the educational quality variables (which in this equation uniquely account for 31.2 percent of explained variance), achievement appears to be considerably more important than attainment among males.

However, examination of the regression coefficients for the individual variables indicates that while eighth grade test score is the fourth strongest of the ten predictors, with a statistically significant beta ($p \geq .01$), its direction of effect on occupational attainment is negative. That is, all else equal, those with higher test scores have achieved lower positions in the labour market, and vice versa.

We have no fully convincing explanation for this result. It is possible that it reflects an interaction between achievement, educational attainment, and SES within this particular sample. It will be recalled that none of this group have completed university; most have not entered university. We know that lower SES students are much less likely than higher SES students, with the same achievement level, to enter university--for the obvious financial reasons. Higher status students who do not go on to university are primarily those with lower levels of academic achievement. Thus, this pool of male labour market entrants may consist of a group of higher status students with generally low test scores, and a significant number of lower SES students with relatively high test scores. The higher SES students may be able to convert their inherited status into relatively good jobs in spite of their lower academic achievement, while many of the lower SES students may end up in inferior jobs in spite of their relatively good academic record, because of their low family status. This explanation is consistent with the evidence assembled through the various stages of this study to date. However, the number of males with jobs in the present sample is not large enough to permit the detailed multivariate cross-tabular analysis which could provide a clear demonstration of the interactions suggested here.[23]

Conclusions

Several general conclusions may be drawn with particular reference to the two major questions guiding this effort:

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[23] Examination of the joint effects in the commonality analysis is not conclusive for this purpose. We are dealing here, to use Lazersfeld's distinction, not with a problem of explanation but of specification, for which regression analysis, in whatever form, is a clumsy tool.

1. For both sexes, educational variables are more powerful predictors of occupational attainment than is family social status. This relationship is very pronounced among males and somewhat attenuated among females.
2. For females, educational attainment is more important than educational achievement; the latter has a negligible effect on occupational destination. Among males, the reverse is the case; educational achievement suppresses the relatively small effect of years of schooling, but it operates negatively in relation to level of the first job.
3. For both sexes, educational quality variables are much more powerful predictors of occupational attainment than either educational attainment or educational achievement. This relationship is stronger among males than females.

The first conclusion is, in a comparative context, not surprising. The most recent cross-national evidence indicates that, at least for males (there being very little data regarding females), the effect of educational attainment, relative to status of origin, upon occupational attainment is quite weak in very underdeveloped societies; that its effect becomes strong among societies in the mid-range of development; and that the relative effect of educational attainment begins to decrease among highly developed nations. (Lin and Yauger, 1975; Schiefelbein and Farrell, 1978a; Heyneman's study of Malawi may provide an exception to this pattern

(1980, pp. 40-41). Chile being a middle range society in terms of economic development, the data for males fit this pattern. What is particularly new here is the discovery that the relationship is somewhat different for females. We have developed elsewhere a detailed analysis and explanation of female labour market entry patterns in Chile (Schiefelbein and Farrell, 1980).

The second conclusion, for women, is entirely consistent with the argument we have presented here and elsewhere regarding female occupational behaviour in this nation. The negative net effect of educational achievement for men remains puzzling. The tentative explanation advanced here requires further testing.

It is the third conclusion, the relatively strong impact of educational quality on occupational attainment, net of educational attainment and achievement, which is perhaps the most powerful, certainly the most surprising, result of these analyses. We have consistently found, through earlier stages of this study, that various indicators of schooling quality have a powerful net impact upon such educational "results" as levels of learning and years of schooling completed. The existing comparative data regarding the effect of schooling quality on occupational attainment are both limited and inconclusive. Jencks' analysis of U.S. data indicates that variations in school quality have no noticeable relationship with variations in later income (Jencks, 1979, p.295). Currie's data from Uganda (1974) show a significant relationship between quality of the secondary school attended and occupational attainment (r = .16) but the main effect of school quality is indirect, through its influence on academic performance. Heyneman's Malawi data (1980, Table 20) show that the distinction between a boarding and a day secondary school (an indirect measure of quality, since boarding schools in that society tend to have better facilities and teachers, and higher per-pupil costs) is the third strongest of five predictors of later earnings in a regression equation.[24] However, the quality variable accounts for only two percent of the explained variance, with years of secondary schooling and examination performance (in that order) accounting for the other 98 percent.

These results from previous stages of this study and studies in other nations, plus the consistent use of educational attainment and/or achievement as predictors in studies of occupational attainment, and the evidence cited above that educational attainment particularly is an important determinant of occupational level, net of SES, in the more advanced developing nations, would easily lead one to expect, for these Chilean young people, that schooling quality might have some direct effect on occupational attainment, but that most of the effect would probably be indirect, through an influence on educational attainment and/or achievement. The results reported here clearly deviate markedly from that expectation.[25] Educational quality has a strong direct effect on occupational attainment. The indirect effect through educational attainment (joint effect CD in Tables 8 and 9) is moderate, and much less than the unique effect, for males (accounting for 6.8 percent of explained variance), and negligible for females (accounting for 2.2 percent of explained variance).

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[24] However, as a matter of policy, the Malawi Government places students with the highest scores on the Primary School Leavers Examination in boarding schools and then allocates the remainder to day schools until all available places have been filled. Hence, part of the observed relationship between school type and examination performance may be due to student selection rather than school quality.

How then to explain these new findings? A rather complex argument is advanced below. It must be considered tentative. Indeed, we would hope that a major function of the circulation of this paper would be to spark discussion and debate regarding the possible meaning of these results.

It is commonly asserted that the formal school curriculum, particularly at the primary and secondary levels, in developing nations, does not generally produce in students specifically job-relevant skills and knowledge (except for those whose "job" is to continue to the next level of schooling). By this argument employers are inclined to hire applicants who have an educational "certificate" (e.g., a primary or secondary diploma) not because they expect that the individual will come to them with highly specific job skills. Rather, the level of education is considered as a proxy indicator of certain generally useful traits and habits: a reasonable level of literacy and numeracy and general knowledge; a fairly high level of mental ability; ambition; perseverance; punctuality, etc.

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[25] The deviation from expectation is so great, in fact, that when these results were first produced, a very careful re-examination of all the computer programming, the data recoding, the hand calculations for the commonality analyses, etc., was undertaken. One's first suspicion, when encountering results so strong and surprising as these, is that they are an artifact of some error. No programming or computational mistakes were discovered. We must assume that these numbers do indeed reflect a substantive reality.

It is also frequently observed that "tests", which are used to permit passage from one year of schooling to the next and, frequently, to determine who shall receive a certificate at the end of a cycle, measure only a small proportion of what students learn from schooling, from both the formal and the "hidden" curricula.

Table 1 indicates that the "certification effect" operates strongly in the Chilean employment market. However, its importance in this sample is limited due to the nature of the study itself. All of these young people have completed primary school, and none have completed university. The fact that we are dealing with a limited range of educational attainment also means that these students are potential entrants to a limited range of the occupational system. As Table 1 shows, practically none of these primary school leavers have entered the lowest quarter of the Chilean occupational spectrum, agricultural labour. At the other extreme, because they do not have university degrees, they cannot have entered the higher professions, such as law, medicine, engineering, or even such lower ranking professions as nursing and teaching, which in Chile require a university degree. We are considering here, therefore, variations among a group of job-seekers who have a limited, and middle, range of educational attainment, and who are competitors for a limited, and middle, range of potential occupations.

This pattern probably helps to account for the relatively low effect of educational attainment. If the full range of variation in education and occupation were included in the sample, the effect would likely be greater.

Moreover, the secondary level certificate cannot be used to discriminate among most of these young people. Fewer than half entered the labour market directly after completing secondary schooling. 52.3 percent of the total sample (60.5 percent of males and 44.1 percent of females) sought their first job with some level of incomplete secondary or incomplete university.

Three observations may follow from the points made above: (1) Potential employers of these young people could not in many cases have relied solely upon the educational credential in making hiring decisions. Rather, they would have had to rely on their direct assessment of the traits and habits for which the credential serves as a proxy measure. (2) Given the high rates of youth unemployment in Chile, there are typically many candidates for any given entry-level job. In such conditions the employer may set an educational credential (in the present case the secondary certificate) as a minimum condition, and then discriminate among applicants using traits observed in a resume or an interview. (3) The schooling quality variables may have their greatest impact not upon formal test performance, which often determines educational promotion, but upon those general, and subtler, traits for which a potential employer is seeking in a job applicant. That small portion of all the learning outcomes from schooling which is measured by formal tests may be very appropriate as a predictor of future schooling performance; it may be missing the learning outcomes which employers most seek, and which they must in the situation described here try to assess directly. For example, a young male entrant to the middle segment of the Chilean occupational structure may be at a considerable advantage if he has taken non-formal courses, even if not directly related to the job being sought. Such courses may indicate to the prospective employer a desire and willingness to learn. Attendance at an academic Liceo may be taken as an indicator of a generally high intellectual ability.[26] An adequate supply of textbooks may have increased his level of literacy and general knowledge, whether or not reflected in formal test performance. And so on. From the student's point of view, these educational quality indicators may provide an environment in which he is more likely to acquire the traits which are most highly regarded by employers, making him a more effective job-seeker. In summary, in the job competition among young people who all come from roughly the same mid range level of the educational system and who are trying to enter roughly the same level of the occupational structure, wherein the "credential effect" cannot, by definition, come fully into play, educational quality variables may affect a student's general level of knowledge, his/her perceived level of intelligence and willingness to learn, and/or the subtler traits of personality, character, "presentation of self", which influence the decisions of potential employers.

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[26] Some comparative support for this argument is found in the unpublished results of a very detailed study of the occupational destinations of secondary graduates and leavers in Ontario, Canada. In that study it was found that "type of secondary program" (general arts and science, business and commerce, trades) and "level of instruction" (in the

Next Steps

As is typically the case, these results raise as many (or more) questions as they answer. Even though we have just advanced one line of explanation for the most startling and strongest finding reported here, we cannot yet say with confidence that we understand why the educational quality variables have so relatively great a unique effect upon occupational

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Ontario system secondary students may study the same subject at any one of six different levels of difficulty, depending upon their past academic performance) can be more important determinants of occupational destination than certification itself (N. Rowen, OISE, Toronto: personal communication). In the Chilean context, "School type, 1971", which measures whether a student attended an academically oriented Liceo, a commercial school, or one of several types of technical schools, all of which have the same program length (4 years), is equivalent to these two variables in the Ontario study.

attainment. Theoretically this is a very fundamental question. In relation to policy, the implications are not altogether clear. On the one hand, these results, particularly if taken in conjunction with other results regarding educational quality variables in developing nations, suggest that investment in the kinds of educational quality indicators identified here is likely to have a high payoff, not only in educational success but in terms of the long-term life-destiny of young people. On the other hand we need to understand much better why and how these quality variables have their effect in order to judge how much investment in them, under what conditions, is likely to be most productive.

Several lines of attack could increase our understanding. (1) It would be useful to undertake further, more complex, secondary analyses of the data presented here. Even if the relatively small sample size produced unacceptable levels of statistical significance, the results could be instructive. (2) We also need detailed observational studies of how these educational quality variables operate in the schooling and occupational lives of young people. The actual behaviours involved in the translation of investments in school quality into educational and occupational results are very poorly understood. (3) The production of similar data from societies at different levels of development, and with different social structural characteristics, is crucial to the interpretation of these results.

The data reported here refer, of course, only to those who obtained a first job. In societies with high youth unemployment rates, such as Chile in the 1970s, there are large numbers of school leavers who have been unable to find employment. Interpretation of the comparisons among those who have been successful in the initial job search are likely to be much enriched by analysis of the differences between those who have and have not found a job at all.

As noted above, we have been able to consider here only the first job acquired. We cannot automatically assume that this first job represents a life-time occupational niche. We are planning an additional follow-up of these subjects in the mid 1980s, by which time they will have probably settled into stable long-term occupational positions. As students of social mobility frequently note, within-career mobility patterns are seldom studied. This is a particularly serious gap in our understanding of developing societies, wherein we expect (or at least we hope for) profound alterations in the economic and occupational structure during the lifetimes of current and recent students.

In addition, it would be very useful to undertake similar studies in other nations, both at approximately the same level of development as Chile, and at different levels. As has been noted several times above, Chile is in several respects an unusual developing country, particularly in terms of rates and types of educational and occupational participation. Moreover, the particular cohort of young people studied here is in some ways unusual in the Chilean historical context. These youngsters were in primary school when the 1965-70 educational reform of the Frei regime was implemented, one of whose effects was a substantial increase in primary school completion rates. In the immediately preceding period many of these students, particularly those from lower status families, would never have reached the eighth grade. Moreover, they entered secondary school at precisely the time when the newly elected Allende regime was expanding the availability of secondary school places even beyond a substantial increase under the Frei reform. Thus these students had a higher probability than previous cohorts of entering secondary school. Then, as noted, those who left school entered the labour market in an economically atypical period. Although it can be said that the experience of any given cohort of youth in any society is different from any preceding or following group, this particular cohort may be more atypical than most.

Nonetheless, there are three kinds of evidence which suggest that these findings probably are generalizable. First, the detailed interview data from the 1977 follow-up, combined with our own understanding of Chilean education before and after the 1970-77 period, do not suggest any dramatic changes in the way this particular cohort experienced schooling (perhaps we tend to overestimate the effect of sudden, even dramatic, socio-political changes on so basic a social institution as education). Second, the results of the initial phase of this study, reported in the early 1970s (Schiefelbein and Farrell,

1974) were among the first examinations of the effect of school quality variables on educational achievement in developing nations. A number of subsequent studies in other developing nations have confirmed the general pattern found in Chile (Heyneman, 1976). Third, the effect of educational attainment, relative to family SES, on occupational outcomes in Chile is very consistent with the small amount of available comparative data (Schiefelbein and Farrell, 1978a). However, only additional comparative data can give us a firm fix on the generalizability of these findings, particularly the effect of schooling quality on occupational destination, either to other nations or to future cohorts of Chilean youth.

It should be noted at this juncture that this paper is only one of a long series, already published, in draft, or planned, in which we are reporting the results of various aspects of a very large study. Many themes which are only briefly touched upon here are, or will be, fully developed elsewhere. For example, a subsequent paper will examine in detail patterns of job search and predictors of job acquisition, which are important not only in themselves, but for fully understanding some of the patterns reported here. Occupational aspirations, which have here been treated as only one of a number of predictors of occupational attainment (as a "personal characteristic"), are elsewhere considered as an educational outcome in their own right. (Schiefelbein and Farrell, 1979, pp.94-97.) Similarly, non-formal education has been treated here simply as one predictor.[27] We have a very rich set of information regarding the non-formal educational experiences of these young people which will be analyzed and discussed in forthcoming papers.

We should also keep clearly in mind that locating a particular kind of first job is only one of a long series of educational outcomes, each of which is at least to some extent the product of previous educational results, and a "cause" of subsequent life-events. In a study such as this we are attempting to map some aspects of the extremely complex process through which children born into particular circumstances grow into adults with their own individual life trajectories. The data reported here clearly show the complexity of the factors which influence just one of these stages, or decision points, in a person's life. A fundamental challenge before us is to find theoretical frameworks and statistical methods which will permit us to more fully unravel the entire tangled array of social processes, key transition points, and the factors which influence them, which cumulatively bring individuals in any given society into very different adult life situations. Our experience in working with the data from this study indicates that even the most sophisticated techniques in the current armory (e.g. path analysis) can by themselves capture only a portion of the phenomena we are trying to understand; that a variety of methodological approaches must be taken to the same data set; and that often we can only speculate about the behaviour which is driving the numbers.

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[27] Although the measure used is, strictly speaking, quantitative (number of non-formal courses) we have referred to it as an educational quality variable because it indexes the individual's exposure to educational experiences which are qualitatively distinct from standard formal schooling.

In this context we can finally observe that occupation attained, the result treated here, is only one aspect of the effect of education on the long-term destiny of individuals. Many young people, especially women in many societies, will never enter the labour market. Even for those men and women who do work, the quality of their lives, and the effect of their lives on the society in which they live, are far from completely determined by the kind of job they have. We are very much in need of studies which examine the effects of education on non-occupational characteristics of adult life.

FACTORS THAT AFFECT CHANGES IN ACADEMIC ACHIEVEMENT

Ernesto Schiefelbein and Joseph P. Farrell

During the past decade a substantial literature has developed regarding factors that affect the academic achievement of children in school, in both developed and developing societies. (Schiefelbein and Simmons, 1978). Much of this literature has been focussed on two issues: (1) the extent to which school-related factors have an effect on achievement independent of the effect of home background characteristics; and (2) a search for educational policy variables which may be used in developing nations to increase achievement levels, particularly among the children of the poor. With reference to the first issue it now appears that there is a systematic relationship between level of national development and the independent effect of school-related variables. The more developed a society the greater is the influence of home background on achievement and the smaller is the effect of school variables (see Heyneman, 1976, Heyneman and Loxley, forthcoming, and Farrell, 1981). However, even in relatively advanced developing societies, such as Chile, school factors have been found to be more important than home background (Schiefelbein and Farrell, 1974). The evidence regarding particular educational policy variables is far less consistent, with many individual variables found to be positively associated with achievement in some studies but having no or negative effects in other studies. Farrell, Heyneman and Sepulveda (1978) have recently suggested that the individual school quality variable with the most consistent positive effect on achievement is textbook availability.

However, a very serious limitation of most existing achievement studies is that they are cross-sectional and deal with only one achievement measure taken at a single point in time. One can get from them little indication of the long-term effects of schooling input factors, while we assume that knowledge acquisition and school's effect upon it is continuous and cumulative. Moreover, one cannot get an estimation of the effect of school factors on changes in achievement levels.

The present paper, drawing upon data from an on-going longitudinal study of young people in Chile, attempts to address this gap. The specific question considered here is the following: what factors affect change in achievement level among Chilean youth between the end of primary and the end of secondary schooling? This can be seen as a first step toward developing a "value added" model of the schooling process. Taking achievement levels at the end of primary schooling as given, we ask what variables have influenced changes in those levels by the end of secondary schooling.

The achievement level at the first point in time is taken from a national test which was administered annually to all students in the eighth grade, in this case in 1970. It was a 100-item test covering equally verbal and mathematical skills. End-secondary achievement scores are taken from the "Academic Aptitude Test", a university admission examination taken by most Chilean students during the last year of secondary school. Predictor variables are taken from extensive questionnaires administered to the subjects in 1970 and 1977, and, at the earlier period, to their teachers and school directors. (For complete descriptions of the various phases of the study see Schiefelbein and Farrell, 1973, 1974, 1978, 1979.) The sample used here consists of just over 500 students for whom both achievement scores, as well as complete sets of predictor data, are available.

Limitations

In interpreting these data certain basic features of the Chilean educational system must be kept in mind. During the time when these subjects were in school almost all eligible Chilean children entered primary school. However, only about 50 percent of a starting grade one cohort would complete 8 years of primary schooling. As we have shown earlier (Schiefelbein and Farrell, 1978a) survival to the end of primary school is strongly associated with father's occupation and education. Thus before first contact was made with these subjects, at the end of grade 8, just over 80 percent of the children of agricultural workers and about half of the children of urban industrial workers had already dropped out of school. Almost all those who finished grade 8 in Chile continued to the first year of secondary school, but only about 40 percent completed secondary schooling. Survival through secondary school is less strongly associated with social class background, but is strongly linked to previous academic performance and a number of educational "quality" variables (see Schiefelbein and Farrell, 1979, p.73). Since only those who took the university entrance examination are considered in this analysis, we are looking at changes in achievement among that approximately 20 percent of the starting first grade cohort who have survived a rigorous social and academic screening process in order to reach the final year of secondary school.[28]

It should also be noted that these students attended secondary school during a time of extraordinary political, social and economic turmoil in Chile. We have found no indications that this significantly affected the educational experience of these young people in a manner that would systematically bias the results presented here. However, the possibility of an undetected effect must be kept in mind when judging the generalizability of these findings, or when comparing them to results from other societies.

Methodology

Originally, we had considered using the two test scores to construct an index of achievement change for each individual. However, several serious problems were encountered. First, the two tests differed both in their measurements and their substance. The two tests differed in number of questions asked, substantive areas tapped by questions, level of difficulty (necessarily), method of forming final scores, and the nature of the populations on which they had been normed. We concluded that while it may have been statistically possible to adjust the two sets of scores to a common metric, this would have implied a greater degree of similarity between the two instruments than we could justify. Beyond this, any such index of change would necessarily be influenced by the starting scores of each individual, whether one used absolute or percentage changes, or used one of several methods of calculating deviations from predicted scores from regression analysis (see Adams and Farrell, 1967, Chapter 8, for an extended discussion of these problems). Consequently, we abandoned this approach and attacked the problem from a different direction.

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[28] In spite of this selection process, a sufficient number of lower SES students were found in the sample to permit meaningful analysis by social class. However, those lower status students who did survive, in spite of their disadvantages, likely possess some special characteristics (e.g., intelligence, motivation, uniquely stimulating family background, etc.) which distinguish them from their peers who left school at an earlier time.

There is, as one would expect, a positive and fairly strong correlation between the two test scores (r = .43). However, this indicates that a large portion of the variance in final test scores cannot be explained by initial test scores. We can think of this (unexplained) portion of the variance in final test scores as representing changes from the relative position on the first test, which must be accounted for by other explanatory variables. Thus, we have entered 8th grade test score, and a number of other predictors, in regression analyses on the final scores. (Heyneman and Jamison, 1980, use a similar approach.) The question we ask, then, is: given the effect of previous achievement on later achievement, what is the predictive effect of other classes of variables? We have used commonality analysis in conjunction with standard multiple regressions in order to identify the "unique" effect of each variable set included and to specify the amount of variance explained by each possible combination of predictor sets. It should be noted that the variables included in the analyses reported here have been selected on the basis of a series of preliminary screenings designed to identify those which could potentially have a significant effect upon later achievement and which were not highly intercorrelated among themselves.

Our particular interest is in the relative effect upon achievement changes of educational "quality" variables which can be manipulated by policy. The results are first presented for the entire sample, and then separately for high and low SES students in order to focus attention upon factors which may be particularly important for achievement levels of that relatively small proportion of poor youngsters who stay in school until the end of secondary.

Results for the Total Sample

In Table 10, the regression analysis results are presented for the entire sample. The first thing to note is that the total R^2 is relatively high for this type of analysis, perhaps due to the presence

TABLE 10

REGRESSION ANALYSIS ON UNIVERSITY ENTRANCE TEST SCORES: TOTAL SAMPLE ($R^2 = .624$)

Variables[1]	Beta
Average size of secondary class	.372**
8th grade test score	.288**
Text book availability 8th grade	.234**
Height (proxy for malnutrition)	.177**
Personal estimation of academic success	.156**
Sex (1 = male; 2 = female) .	-.140**
Lived in city (=1) or country (=2) when young	.123**
Availability of TV in home	.099*
Age	.088*
Level of urbanization of province where now lives	-.088*
Hours of free reading 8th grade level	.082*
Father's education	.065
Occupational aspirations	.051
Personal estimation of lack of academic problems	.045
Hours of free reading secondary level	.026
Education of parents of 8th grade teachers	-.024
Pedagogical excellence of 8th grade school	-.019
Direct stimulus of parents	-.010
Pre-service of 8th grade teachers	.001

**sig. > .01
*sig. > .05
Total equation sig. > .01

[1] See appendix for descriptions of all variables used in these tables.

in the equation of a measure of earlier achievement. Together these 19 predictor variables explain almost 2/3 of the variance in university entrance examination scores. The most powerful single predictor is "average size of secondary class". The positive sign of the regression coefficient indicates that students from larger classes tended to outperform those from smaller classes. This result is generally consistent with the findings of a previous stage of this study, where average class size at the 8th grade level was found to have a low but positive correlation with 8th grade test scores (r = .07) (Schiefelbein and Farrell, 1974). What is surprising here is not the direction but the strength of the association (while positively associated, class size did not survive preliminary screening for regressions on 8th grade test scores). It is possible that class size is actually a proxy measure of overall school quality. Because more students try to attend schools with a reputation for high quality such schools tend to have larger classes even while providing a superior education. However, a detailed test of this explanation for the 8th grade finding indicated that the positive association between class size and achievement could not be explained by differences in school quality (Schiefelbein and Farrell, 1974, pp.26-27. Not surprisingly, given the correlation noted above, "8th grade test score" is a powerful predictor of later achievement. "Textbook availability 8th grade" is the next most powerful predictor. What is particularly interesting here is that this variable refers to the 8th grade level, four years before taking the university admission test. Secondary level text availability (which is moderately correlated with 8th grade text availability--r = .23) did not survive the preliminary screening process and is therefore not in this equation. There is a suggestion here of a cumulative long-term impact of the provision of adequate supplies of learning materials at the primary level. Indeed, text availability at the 8th grade level is a relatively more powerful predictor of achievement at the end of secondary than it is of scores on the 8th grade test itself (see Schiefelbein and Farrell, 1974, p.22). (As we have shown in the first paper in this set, 8th grade text availability has an even longer term effect, upon "success" in the labour market.) As described in the appendix, "height" is used here as a proxy indicator of malnutrition, measured at the 8th grade level. Much has been written about the detrimental effect of early childhood malnutrition on school performance in the early primary years. The strength of that variable in this equation suggests a significant long-term effect on learning, even among those who have managed to survive in school to the end of secondary in spite of early malnutrition. Next appears the student's own estimation of his/her academic success. Students who perceive themselves to be doing well in secondary school tend to obtain high scores on the university entrance test. Sex is also an important predictor, with males tending to score higher than females. Elsewhere we have developed a detailed explanation for this phenomenon in the Chilean situation (Schiefelbein and Farrell, 1980).

Of greater interest for present purposes are the results of the commonality analysis in which the unique effects of 8th grade achievement and of each of three other variable sets (personal characteristics of the student, family and community characteristics, and school quality variables) are identified as well as the joint effects of each possible combination of variable sets (see Table 11). The specific variables included in each set are noted at the foot of the table. The first column presents the percentage of total variance accounted for by each unique or joint effect; to facilitate comparison of this table with commonality analyses presented later, the second column presents the unique and joint effects as percentages of the variance explained by the regression equation.

Several patterns in this table are noteworthy. First, achievement at the 8th grade level, in spite of its relatively high regression weight in Table 10, accounts for only about 10 percent of the explained variance independent of the effect of other variables (unique effect C). Even when one adds in all of the joint effects in which this variable enters (AC, BC, etc.) less than 1/3 of the explained variance is attributable to the direct or indirect effects of achievement in the 8th grade. Put another way, most of the variance in university entrance test scores represents changes from the relative level of achievement four years earlier, which must be explained by other predictors.

TABLE 11

COMMONALITY ANALYSIS ON UNIVERSITY ENTRANCE TEST SCORES: TOTAL SAMPLE

Groups	% total variance (Total $R^2 = .624$)	% of explained variance
Unique Effects		
A. Personal characteristics of student	.066	10.6
B. Family and community characteristics	.065	10.4
C. 8th grade test score	.066	10.6
D. School quality variables	.150	24.0
Joint Effects		
AB	.024	3.8
AC	.042	6.7
AD	.052	8.3
BC	.010	1.6
BD	.033	5.3
CD	.000	-
ABC	.007	1.1
ABD	.048	7.7
BCD	.021	3.4
ACD	.003	0.5
ABCD	.037	5.9

Variables included in groups:

A. Age; Personal estimation of academic success; sex; Hours of free reading 8th grade level; hours of free reading secondary level; Occupational aspirations.

B. Father's education; Availability of TV in home; Height (proxy for malnutrition); Direct stimulus of parents; Level of urbanization of province where now lives; Lived in city or country when young.

C. 8th grade test score

D. Text book availability 8th grade; Pedagogical excellence of 8th grade school; Pre-service training of 8th grade teachers; Education of parents of 8th grade teachers; Average size of secondary class; Personal estimation of lack of academic problems.

Turning then to the other predictor variables, which are the primary concern here, we note that the unique effect of family and community characteristics is also relatively modest. The regression weights reported in Table 1 suggest that such effect as this variable set has is primarily attributable to the level of urbanization of the student's community environment rather than to the socio-economic status of the individual student's family (as measured by father's education). We conclude that changes in level of academic achievement during secondary schooling among this group of students cannot be accounted for to any significant degree by the individual student's socio-economic origins, and only to a limited extent by the degree of urbanization of the student's place of birth or residence. This finding may relate to the nature of this sample of students. As noted above we are dealing here only with the academically most successful students, those 20% of a grade one group who have survived a long and rigorous educational screening process. Those lower status students who have managed to stay in school long enough, and have succeeded well enough, to sit for the university entrance examination, have long since overcome the disadvantages of their family circumstances, disadvantages which have removed most of their peers from the schooling system at a much earlier stage. However, Heyneman and Loxley tested this "selectivity" explanation using I.E.A. data from several nations, including Chile. They conclude that this pre-selection of lower class school survivors does not account for the low relationship between SES and school achievement in developing nations. (Heyneman and Loxley, forthcoming, pp.18-19.)

The most important finding from Table 11 is the relatively powerful effect of school quality variables. Uniquely, this variable set accounts for almost 1/4 of the explained variance, far greater than any of the other unique effects. When one adds in all of the joint effects in which group D is included one finds that school quality variables directly or indirectly account for 55.1 percent of the explained variance in end-secondary achievement. We conclude, then that among this group of academically successful Chilean students changes in achievement level during secondary schooling can be explained primarily by the quality of the educational experience they have received.

Results Specified by Social Status

To identify possibly distinct patterns of effect between lower and higher social status youngsters, the sample has been dichotomized on father's education. The results are reported in Tables 12 (regression weights) and 13 (commonality analyses). Splitting the sample in halves reduced the N for each of the two analyses to the point that statistically significant regression equations could not be produced using all 19 of the predictors reported in Tables 10 and 11. After some experimentation 8 predictors were selected which were the best set for both high and low status students and which produced statistically significant equations for both groups.

TABLE 12

REGRESSION ANALYSIS ON UNIVERSITY ENTRANCE TEST SCORES: HIGH AND LOW SES STUDENTS

Variable	High SES		Low SES	
	Beta	Rank	Beta	Rank
Average size of secondary class	.386**	1	.330**	3
Textbook availability 8th grade	.323**	2	.124	5
8th grade test score	.274**	3	.464**	1
Personal estimate of academic success	.217**	4	-.001	8
Height (proxy for malnutrition)	.124	5	.376**	2
Sex	-.071	6	-.195*	4
Father's education	.066	7	-.087	6
Lived in city or country when young	-.009	8	-.063	7

**sig. > .01
*sig. > .05
Both total equations sig. > .01

TABLE 13

COMMONALITY ANALYSIS ON UNIVERSITY ENTRANCE TEST SCORES: HIGH AND LOW SES STUDENTS

Groups	High SES		Low SES	
	% total variance (R^2 = .557)	% of explained variance	% total variance (R^2 = .615)	% of explained variance
Unique Effects				
A. Personal characteristics of student	.046	8.3 (9.4)*	.036	5.8 (8.5)*
B. Family and community characteristics	.020	3.6 (4.1)*	.147	23.9 (35.0)*
C. 8th grade test score	.067	12.0	.195	31.7
D School quality variables	.182	32.7 (37.1)	.111	18.0 (26.5)*
Joint Effects				
AB	.005	0.9	.043	7.0
AC	.041	7.4	.010	1.6
AD	.050	16.2	.011	1.8
BC	.009	1.6	.000	-
BD	.022	3.9	.019	3.1
CD	.000	-	.031	5.0
ABC	.008	1.4	.000	-
ABD	.019	3.4	.001	0.1
ACD	.025	4.5	.000	-
BCD	.000	-	.014	2.3
ABCD	.023	4.1	.000	-

Variables included in groups

A. Personal estimation of academic success; sex.
B. Father's education; height; lived in city or country when young.
C. 8th grade test score.
D. Average size of secondary class; Textbook availability 8th grade.

*figure in parentheses is percentage of that portion of the explained variance which is not accounted for by 8th grade test score.

The differences are quite remarkable. The unique effect of 8th grade test score is much stronger among lower status students, accounting for 31.7 percent of the explained variance (vs. 12.0 percent for higher status students). For more disadvantaged children establishing a pattern of academic success in primary school appears to be quite important for future performance. This also suggests that there are fewer and/or less marked changes in achievement levels among lower status youngsters during secondary schooling. That is, once one takes into account the effect of 8th grade achievement, there is less variance in end-secondary achievement "left over" for the other variable sets to explain. To take this difference between low and high status groups into account when comparing the effects of the other variable sets, figures are provided in Table 13 for the unique effects of groups A, B, and D, in parentheses, which note each as a percentage of that portion of the explained variance which is not accounted for by the unique effect of 8th grade test score.

Family and community characteristics are also much more important among lower than upper status students. Table 12 suggests that malnutrition is the primary factor operating here. This reinforces a point made above. Even among the most academically successful education "survivors" from the lower classes, early malnutrition has a powerful long-lasting effect.

Conversely, the unique effect of school quality variables is greater among higher status students, though certainly not negligible among the lower status group. To fully understand the meaning of this finding, we must refer to results from earlier stages of the study--and here the importance of a longitudinal study comes fully into play. In the initial phase of this study we found the 8th grade test score--here the most powerful independent predictor among lower status students--is itself more strongly influenced by school quality variables, particularly textbook availability, operating at the 8th grade level and before, among lower status youngsters.

This finding, plus the discovery of the lasting impact of early malnutrition, suggests that early educational intervention, both in terms of school quality variables and in overcoming nutritional deficits, is essential to the long term educational success of even the highest achievers among the offspring of lower status families in Chile.

THE USE OF TEXTBOOKS BY TEACHERS AND STUDENTS IN LEARNING AND TEACHING

Manuel A. Sepulveda Stuardo and Joseph P. Farrell

Background

Over the past 15 years educational researchers have been examining the relationship between school and non-school variables and student achievement in developed and less developed nations. (Simmons and Alexander, 1975; Schiefelbein and Simmons, 1979; Husen, et.al., 1978; Rosenshine, 1971; Avalos and Haddad, 1979.) The research findings have shown that one of the most clear and consistent relationships between school variables and student achievement is the "availability of textbooks". In studies done in 10 less industrialized societies, 15 out of 18 relationships (83%) are positive (Heyneman, Farrell, Sepulveda, 1978). Unfortunately the data we have about the positive relationship between textbook availability and student achievement does not provide information about the use of textbooks by teachers and students during the teaching-learning process. The research completed to date has put more emphasis on measuring the presence or absence of the textbook in the classroom, to some extent because researchers have used surveys or intervention experiments rather than observation studies.

Textbooks have been counted in different ways, often by asking the school principal or by having the students answer a questionnaire (Farrell and Schiefelbein in Chile; Fuller and Chantavanish in Thailand). In some cases the researchers have themselves counted the textbooks in the schools in the sample (Heyneman in Uganda). The questions asked by the researchers have focused basically upon whether or not the students have (or are provided with) textbooks. Therefore we have no data about when and how students and teachers use the textbooks during the teaching-learning process. We assume that data about these aspects would be crucial because our experience indicates that everything that happens in the classroom is mediated by the teacher's actions. The presence of textbooks may not be sufficient since if the teachers think that the textbooks are not useful, they will not use them. The effectiveness of textbooks depends upon the use made of them by teachers.

When focusing on textbooks during the teaching-learning process several questions arise. For example, does teaching experience influence the use of the textbooks by the teacher? Beeby suggests (1962) that textbooks are an essential aid during the early stages of a teacher's professional development. Katz (1972) and Fuller (1969) claim that beginner teachers put more emphasis on what they are teaching, i.e., they are more content-oriented, than experienced teachers, who are more learner-oriented. One might assume that the first group of teachers

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use the textbook more frequently than the latter group. Other questions arise. Are there differences in the use of textbooks among subject areas, or between school types (public or private); do type of teacher training (normal school or university), amount of in service training, or the social class of the students make a difference?

This paper is intended to provide preliminary answers to the questions just stated. The study from which the data come was carried out in Chile in 1978 and included a sample of 400 teachers and 900 grade 8 students.

Data from Chile

Previous survey research done in Chile (Schiefelbein and Farrell, 1973) found that textbook availability was associated positively with student achievement independent of other variables such as school type (private or public),parental education, teacher sex and age, etc. Textbook availability was measured by asking students in a questionnaire whether they had a text in each of the five academic subject areas--(Spanish, mathematics, social sciences, science and a foreign language). Achievement was measured by a national test in language and mathematics administered to all 8th grade students. The findings suggest that textbook availability influenced student learning more than other school variables (for example, teacher training). It is clear from the data obtained that when students had textbooks, they had higher levels of achievement. We assume however that we might be able to improve the effectiveness of textbooks in the teaching learning process, and the influence of textbooks on student achievement, if we knew more about more specific questions such as:

- do teachers like to use textbooks?
- does teacher experience make a difference?
- have the teachers been trained to use textbooks?
- are there differences between teachers working in public or private schools?
- do methodological differences among teachers relate to differences in the use of textbooks?
- does the subject taught by the teacher make a difference?

Among these questions yet to be answered, perhaps the most fundamental relates to teacher preferences. Years of experience working in teacher training institutions and in primary and secondary schools suggest that if teachers do not perceive textbooks to be useful and/or are not confortable with them, then textbooks will not be used, even if they are available (and even if their use is "officially mandated"). If teachers do not like to use texts, what reasons do they give? What factors are related to their preferences and their behaviour in the classroom?

The data used to provide preliminary answers to such questions come from three different but inter-related samples. The first one is formed by 400 teachers, including five subject areas (language, social studies, math, science and English) from 72 primary and secondary schools. The schools were selected randomly with a sample size sufficient to represent urban, semiurban and semirural zones and different social class characteristics. Second, a sub-sample consisting of 3 primary and 2 secondary schools was selected from the total sample, and from these five schools 30 teachers were selected for observation of their teaching behaviour. The third sample consisted of 900 students from the classes taught by the teachers in the observed sub-sample.

The advantage of this three dimensional approach was that we could observe whether or not the information provided about the use of textbooks in the classroom was consistent among the three different sources: a) the teachers who are expected to work with the textbooks, b) the students who are expected to be using the textbooks, and c) the observers who determined whether the teachers really did use the textbooks while they were teaching.

The 400 teachers answered a questionnaire which included questions about their use of textbooks. The 30 teachers of the sub-sample were observed during a 20-minute period in three different sessions. The objective was to find out, among other things, whether they used textbooks during the teaching act. This was recorded by the observer. Students answered a questionnaire which asked, among other things, whether or not they had textbooks, whether the teacher used the textbooks, and what their own perception was about the usefulness of textbooks in the teaching-learning process.

We know that the availability of the textbooks is mainly determined by parents and/or teachers at the 8th grade level. Sometimes students' parents themselves make the decision to buy textbooks because their own experience suggests that textbooks can be helpful for their children. In other cases, teachers ask for the textbooks and students' parents must buy them, if their financial resources permit. Experience teaches us that only when teachers ask for textbooks will they use them. If the students have textbooks simply because their parents bought them it does not mean that textbooks will be used during the teaching process. Information provided by teachers showed us that. Generally, the presence of textbooks in the classroom does not necessarily mean that teachers and students will use them frequently, or at all.

Results from the Full Teacher Sample

In this study the teachers were asked if they request textbooks for use during the teaching-learning process or at home. The answers given by teachers show a very interesting distribution. Only 23 percent of the respondents said "yes", they always ask for textbooks, which could be considered a relatively low percentage of teachers. This means that only 92 out of 400 teachers included in the sample consider textbooks as a fundamental part of their style of teaching. The rest of the teachers said they use textbooks only "sometimes" (59.3%) or never (17.3%). The percentage of 59.3 must be considered carefully because many teachers who had answered "sometimes" did not use textbooks in the three periods of observation (see below).

When teachers who did not respond "always" were asked the reasons why they used textbooks only "sometimes" or "never", most said that textbooks are not the best didactic material or they are not necessary (Table 14).

TABLE 14 - REASONS FOR USING TEXTBOOKS "SOMETIMES" OR NEVER

Reason		Percent
Not best didactic material or not necessary	174	52.0
Very expensive	50	15.0
They are not interesting	21	6.0
Teachers are not familiar with them	14	4.0
Textbooks help too much	29	8.0
Other	51	15.0
Total	339	100.0

To some extent it is a surprise to find that 78% of the teachers express an ambivalent attitude to textbook use, particularly since governments and international agencies have been interested in providing more free textbooks under the assumption that teachers would want to use them. One of the explanations of this could be their own lack of training in textbook use. Responses given by the teacher sample showed us that only 49.3 percent of all teachers claimed that they had had some training or retraining which focussed on how to use textbooks in the teaching-learning process. Perhaps one of the most important measures to be taken before providing free textbooks in public schools is simply to prepare teachers to use them.

The Use of Texts by the Teacher's Subject Matter

Math and science teachers are less prone than others to use textbooks. The differences among subject areas are strong and statistically significant (see Table 15). The highest percentages of teachers who never use texts are in math (33.3%) and sciences (46.4%). The lowest percentages are in language (5.8%) and English (4.3%). On the other side, the highest percentages of teachers who use textbooks always are in language (44.8%) and English (27.6%). The lowest percentages are in math (9.2%) and science (6.9%).

The distribution by subject areas on principal reasons for not using textbooks (Table 16) parallels the data in Table 15. Math and

TABLE 15 - THE USE OF THE TEXTBOOK BY SUBJECT

SUBJECT	NEVER	SOMETIMES	ALWAYS	TOTAL
LANGUAGE	4.5% 4 5.8%	51.7% 46 19.8%	43.8% 39 44.8%	89
SOC. STUDIES	9.6% 7 10.1%	76.7% 56 24.1%	13.7% 10 11.5%	73
MATHEMATICS	24.5% 23 33.3%	67.0% 63 27.2%	8.5% 8 9.2%	94
SCIENCES	45.1% 32 46.4%	46.5% 33 14.2%	8.5% 6 6.9%	71
ENGLISH	4.9% 3 4.3%	55.7% 34 14.7%	39.3% 24 27.6%	61
TOTAL	69	232	87	Sig. > .0001

TABLE 16 - REASONS FOR NOT USING TEXTBOOKS BY SUBJECTS

SUBJECT	Textbooks are not the best didactic material	Textbooks are not necessary
LANGUAGE	13.5%	19.2%
SOC. STUDIES	18.9%	15.2%
MATHEMATICS	28.4%	32.3%
SCIENCES	20.3%	26.3%
ENGLISH	18.3%	7.1%
TOTAL	100.0%	100.0%

science teachers according to their own description are particularly likely to consider texts unnecessary or not the best didactic material. This suggests that math and sciences teachers prefer to use other didactic material than textbooks when they are teaching, or (from the "sometimes" responses) to not rely exclusively on textbooks.

Teachers were also asked to indicate their level of agreement with the following statement" Textbooks should be used mainly when students are doing exercises, after the lesson has been taught". The differences between teachers of math and science and those teaching language and social studies were significant at the 0.04 level and the contingency coefficient was 0.23. Table 17 shows these differences.

It is clear that there are systematic differences in textbook use and corresponding attitudes toward textbooks among teachers of different subject areas. Why should this be so? It may be that the differences relate to varying possibilities across subject areas to locate suitable non-textbook teaching material. It may be impossible to teach literature without a textbook, as school or public library resources are not available to most Chilean children. Teachers of English as a second language may be unable to find non-text teaching material suitable for the level of mastery of 8th grade students. Conversely, teachers of math and science may find much more material available in the popular press and other easily accessible sources, and may find that they can rely heavily on the blackboard or laboratory. There may also be differential degrees of obsolescence of material across subject areas. Grammar, literature, vocabulary, history, geography do not change rapidly. Science material can rapidly become obsolete. Conversations with some teachers also suggested a concern with the rapid out-dating of "real life" math problems in textbooks in a rapidly changing and high-inflation economy.

TABLE 17 - TEXTBOOKS MUST BE USED IN THE EXERCISE STAGE OF THE CLASS

SUBJECT	STRONGLY AGREE	MORE OR LESS AGREE	MORE OR LESS DISAGREE	STRONGLY DISAGREE	TOTAL
LANGUAGE	32.6% 29 24.0%	32.6% 29 18.4%	19.1% 17 26.6%	15.7% 14 36.8%	89
SOC. STUDIES	25.7% 18 14.9%	41.4% 29 18.4%	20.0% 14 21.9%	12.9% 9 23.7%	70
MATHEMATICS	41.9% 39 32.2%	44.1% 41 25.9%	8.6% 8 12.5%	5.4% 5 13.2%	93
SCIENCES	22.1% 15 12.4%	47.1% 32 20.3%	19.1% 13 20.3%	11.8% 8 21.1%	68
ENGLISH	32.8% 20 16.5%	44.3% 27 17.1%	19.7% 12 18.8%	3.3% 2 5.3%	61
TOTAL	121	158	64	38	sig. =.04

Across subject areas, most teachers report that they use textbooks "sometimes". In no subject do a majority of teachers use texts either "always" or "never" (although in two cases, language and science, one of the extreme proportions approaches 50%). This suggests that most teachers use textbooks as one of a battery of teaching materials, combining them with such didactic aids as the traditional blackboard and student notebook, magazines, newspapers, materials they have prepared themselves, etc. Unfortunately, the category "sometimes" may contain large differences in interpretation. This was an unexpected finding; most teachers were anticipated to either rely heavily on textbooks or not use them at all. The study was not designed to explore the "sometimes" response in detail. It is clear that more research into the actual and obviously varying patterns of textbooks use is needed before establishing policies to provide textbooks to all students.

Teacher Training and Textbook Use

Have teachers received training in the use of textbooks? Obviously, if teachers have not had training in how to use any particular didactic material, they will be less likely to use it, or likely to use it less effectively. As noted previously, only 49.3% of the teachers in this sample had taken some course or been involved in some training activity related to the use of textbooks. Table 18 indicates that

TABLE 18 - TEXTBOOK USE BY TRAINING

TRAINING IN TEXTBOOK USE	TEXTBOOK USE			
	NEVER	SOMETIMES	ALWAYS	TOTAL
YES	9.5% 19 27.9%	65.8% 131 57.0%	24.6% 49 53.8%	199
NO	25.8% 49 72.1%	52.1% 99 43.0%	22.1% 42 46.2%	190
TOTAL	68	230	91	sig.> .0001

there is a significant relationship between exposure to training in textbook use and the propensity to use textbooks. Teachers with some form of training in textbook use are more likely to use textbooks than are those with no such training. Table 19 shows the exposure to training in textbook use by subject area. Here we see that the highest percentages of those without training in textbook use are found among math and science teachers. It may be that teacher trainers in these areas tend not to perceive textbooks as useful teaching aids, and therefore tend not to provide their students with systematic instruction in

TABLE 19 - TRAINING IN TEXTBOOK USE BY SUBJECT

	TRAINING IN TEXTBOOK USE		
SUBJECT	YES	NO	TOTAL
LANGUAGE	60.9% 53 27.5%	39.1% 34 18.1%	87
SOC. STUDIES	61.6% 45 23.3%	38.4% 28 14.9%	73
MATHEMATICS	40.7% 37 19.2%	59.3% 54 28.7%	91
SCIENCES	40.2% 28 14.5%	60.0% 42 22.3%	70
ENGLISH	50.5% 30 15.5%	50.0% 30 16.0%	60
TOTAL	193	188	sig.= .01

their use in the classroom. This suggests that investments in the widespread distribution of textbooks might best be accompanied by insurances that pre-service and in-service training provide teachers with systematic instruction in textbook use.

Teaching Experience and the Use of Textbooks

It is generally assumed that teaching experience has an effect upon teaching style. As teachers acquire experience they become familiar with types of students; they master the content of their subject area; and they therefore become more effective. Some researchers have suggested that because beginning teachers are less confident of their knowledge they rely heavily on textbooks (Fuller 1969). Katz (1972) claims that teachers progress through four developmental stages. In the first they are more concerned with what they are teaching than with whom they are teaching; they are content rather than learner oriented. For such beginning teachers, textbooks could be a very useful tool.

The results of this study do not confirm Katz' suggestions. There is a slight tendency for the percentage of teachers who claim that they "always" use textbooks in their teaching to be associated with an increase of years of experience (see Table 20). Conversely the highest percentage of teachers who "never" use textbooks, 35.7%, is among those with the least teaching experience.

TABLE 20 - TEXTBOOK USE BY EXPERIENCE

	EXPERIENCE			
USE OF TEXT	0-2 YEARS	2-5 YEARS	MORE 5 YEARS	TOTAL
NEVER	22.1% 15 35.7%	22.1% 15 17.4%	55.9% 38 14.1%	68
SOMETIMES	7.6% 18 42.9%	21.5% 51 59.3%	70.9% 168 62.5%	237
ALWAYS	9.8% 9 21.4	21.7% 20 23.3%	68.5% 63 23.4%	92
TOTAL	42	86	269	sig.=.01

Given the importance of subject area in textbook use just noted, it was thought important to try to specify the "teaching experience" results by subject area. The differences by subject area are statistically significant only among those with five or more years of teaching experience. However, one notes a strong tendency for the differences between math and science teachers on the one hand, and language and social studies teachers on the other, to increase with years of experience. Tables 21 and 22 present the figures for those with two to five and five or more years of experience, respectively. Those who have an initial tendency (perhaps from their pre-service training, as reported above) to use textbooks less frequently increase that tendency as they gain experience; those who start their teaching careers inclined to use textbooks increase that tendency as they gain experience. This could suggest that if one wishes to use teacher training as an adjunct to a textbook distribution program, more emphasis should be put on pre-service training, and also in retraining, particularly focussed upon beginning teachers who are less inclined to use texts.

Private vs. Public Schools

It is common to assume that students in private schools come from social and economic backgrounds superior to students in public schools. Thus one might expect teachers in private schools to request and use texts more, since they could assume that parents could afford to purchase them. In Chile during the past 50 years, private education has grown substantially, but many private schools are affiliated with churches or other community service groups, and serve lower class

TABLE 21 - TEXTBOOK USE BY SUBJECT: 2-5 YEARS OF EXPERIENCE

	SUBJECT					
USE OF TEXT	LANGUAGE	SOC. STUDIES	MATHEMATICS	SCIENCES	ENGLISH	TOT.
NEVER	6.7% 1 5.9%	20.0% 3 20.0%	20.0% 3 14.3%	40.0% 6 40.0%	13.3% 2 15.4%	15
SOMETIMES	18.4% 9 52.9%	16.3% 8 53.3%	34.7% 17 81.0%	14.3% 7 46.7%	16.3% 8 61.5%	49
ALWAYS	41.2% 7 41.2%	23.5% 4 26.7%	5.9% 1 4.8%	11.8% 2 13.3%	17.6% 3 23.1%	17
TOTAL	17	15	21	15	13	sig.= .07

TABLE 22 - TEXTBOOK USE BY SUBJECT: MORE THAN 5 YEARS OF EXPERIENCE

	SUBJECT					
USE OF TEXT	LANGUAGE	SOC. STUDIES	MATHEMATICS	SCIENCES	ENGLISH	TOTAL
NEVER	5.3% 2 3.0%	10.5% 4 7.3%	34.2% 13 22.4%	50.0% 19 42.2%	0.0% 0 0.0%	38
SOMETIMES	20.5% 34 51.5%	27.1% 45 81.8%	24.7% 41 70.7%	13.9% 23 51.1%	13.9% 23 56.1%	166
ALWAYS	49.2% 30 45.5%	9.8% 6 10.9%	6.6% 4 6.9%	4.9% 3 6.7%	29.5% 18 43.9%	61
TOTAL	66	55	58	45	41	sig.>.0001

children without requiring fees. This situation may explain why no statistically significant differences were found in textbook use between private and public schools.

Social Class of School Clientele

A more direct measure of the social class of each school was therefore applied: the judgement of the investigator of the nature of the community served by each school. The schools were classified as lower, middle, or upper class. (Although it should be noted that schools serving the very poorest rural children were not included in this sample.) No statistically significant differences were found among these three different types of schools in tendency of teachers to use texts. These results also were specified by subject area. No significant differences were found.

Primary vs. Secondary Schools

Within the Chilean educational system 8th grade classes can be found either in primary or secondary schools. The reform of 1965-70 changed the educational structure from six years of primary and six years of secondary to an eight-four system. However, many grade eight classes are still physically located in secondary schools. The main difference between the two types of schools is that 8th grade classes taught in primary schools tend to be taught by up-graded primary teachers who were originally normal school graduates, while those in secondary schools are taught by university-trained ex-secondary teachers. Table 23 indicates that there is a slight, but statistically significant, tendency for textbook use to be more prevalent in primary schools.

TABLE 23 - TEXTBOOK USE IN PRIMARY AND SECONDARY SCHOOLS

USE OF TEXTS	PRIMARY SCHOOL	SECONDARY SCHOOL
NEVER	39 14.5%	30 24.4%
SOMETIMES	172 62.4%	65 52.8%
ALWAYS	64 23.1%	28 22.8%
TOTAL	275	123

sig.=.03

Since the curriculum is the same in both types of schools with 8th grades, and neither school social class nor school ownership (public vs. private) explain differences in textbook use, it may be that differences in the original training of most teachers in the two types of schools accounts for the difference. If normal school training concentrated less on formal content and more on learning psychology and teaching methodology, it is possible that teachers from the normal schools (which have now been phased out in favor of having all teachers trained at the university) were better trained in pedagogical methodology. It is also possible that, having been trained at a lower academic level, and being older, the normal school teachers are less able to use didactic materials other than the textbook. This is an area that needs more investigation.

Teaching Style and Use of Textbooks

Previously we have noted the suggestion that teachers who are more content-oriented in their teaching style may be more likely to use textbooks than those who are more learner-oriented. Content-oriented teachers are more concerned with what they have to teach than with whom they are teaching. The content becomes a goal more than a means. Learner-oriented teachers, on the other hand, put more emphasis on students than on content. The focus of the teaching process is on learners. A number of teacher questionnaire items were analyzed, using the Lertap statistical program, to produce a scale measuring the extent to which a teacher's behaviour was content oriented. Scores on this scale are related to textbook use in Table 24.

TABLE 24 - TEACHING STYLE AND TEXTBOOK USE

	SCALE OF CONTENT ORIENTED TEACHER BEHAVIOR			
	SCORE IN THE SCALE			
USE OF TEXTS	6 - 11	12 - 17	18 - 23	TOTAL
NEVER	29% 20 28.2%	49% 33 15.0%	22% 15 15.5%	68
SOMETIMES	14% 31 43.6%	61% 141 64.1%	25% 56 57.7%	228
ALWAYS	22% 20 28.2%	50% 46 20.9%	28% 26 26.8%	92
TOTAL	71	220	97	sig.=.03

There is some tendency for teachers who are more content-oriented to use textbooks more. Of those teachers who score lowest on the content oriented behaviour scale, (scores 6-11) 28.2% never used texts compared to 15.5% of those who score highest on the scale. While the differences are not huge, they are in the "predicted" direction. (Chi square. 50.2, Significance 0.03, Contingency Coefficient 0.38.) This relationship was specified by subject area, but no significant differences were discovered.

Teacher Observation Subsample

A subsample of 30 teachers was chosen for detailed observation of their teaching behaviour. One objective of this exercise was to check whether teachers do in practice what they claimed to do on the questionnaires. We recorded whether each teacher used textbooks during the three periods in which she/he was observed. Generally the observation results are consistent with those obtained from the questionnaires (Table 25). Questionnaire responses indicated that language teachers were most likely to use textbooks. Among the 8 language teachers included in the subsample, seven claimed to use textbooks "sometimes" and one "always". During the observation process the one who responded "always" used textbooks in all three class periods observed; of the other seven teachers, three used textbooks in two periods, three in one period, and only one of those who claimed to use textbooks sometimes did it in no period.

The observed behaviour among other teachers was less consistent. All six observed social studies teachers claimed on the questionnaire to use textbooks "sometimes". However, only two of them used texts in one or two of the periods observed and the other four never were observed to use texts.

In the survey math and science teachers were found to use textbooks infrequently. The subsample included nine math teachers.

TABLE 25 - OBSERVED TEXTBOOK USE BY SUBJECT

	Questionnaire Responses	Observations	
Subject	Using Textbook - Nº of teacher	Nº of sessions, in which each teacher uses textbook *	Average observations
Language	never = 0 sometimes = 7 always = 1 tot = 8	(A=1) (B=2) (C=1) (D=0) (E=1) (F=2) (G=2) (H=3)	3 = 1 3 = 2 1 = 3 1 = 0
S. Studies	N = 0 S.T = 6 A = 0 Tot = 6	(A=0) (B=2) (C=0) (D=1) (E=0) (F=0)	1 = 1 1 = 2 4 = 0
Math	N = 4 S.T = 4 A = 1 Tot = 9	(A=0) (B=0) (C=0) (D=0) (E=0) (F=0) (G=0) (H=0) (A=0)	9 = 0
Sciences	N = 2 S.T = 5 A = - Tot = 7	(A=0) (B=0) (C=0) (D=0) (E=0) (F=0) (G=0)	7 = 0

*The letters in brackets identify individual teachers. The number which follows indicates the number of observed periods in which that teacher used a textbook (maximum 3).

Four of them claimed in the questionnaire that they "never" used texts; four claimed to use them sometimes; and one said "always". None of these nine math teachers was observed to be using a textbook. A similar situation is found among the seven science teachers. Five claimed to use texts "sometimes" and two "never", yet none were observed to use a textbook. (However, four out of nine math teachers and two out of seven sciences teachers had claimed on the questionnaire that they used textbooks in homework assignments.)

Observation findings make even more dramatic the differences between teachers of various subject areas. Language teachers mean what they say when they report textbook usage in class. Teachers of other areas exaggerate their usage. Put another way, "sometimes" for language teachers appears to mean "often", while for other teachers it means "rarely".

Results from the Student Sample

In examining the responses of the students to questions related to textbooks we are interested in the actual availability of texts to students, their attitudes toward and perceptions of textbooks, and how these correspond to the behaviour and attitudes of teachers as discussed above. One would assume that students in classes where the teacher does not use a textbook will not ordinarily have a text--although in some cases they may have one which their parents bought even though the teacher did not ask for one. However, one cannot assume the converse, that in classes where the teacher uses a textbook all students will have one. Many may not be able to buy textbooks.

Table 26 provides the distribution of textbook availability for the entire student sample. Here we observe that just over half of the students (51.8%) do not have a textbook. Table 27 breaks this distribution out by subject area. Here we note a close correspondence with the teacher data. In language, where the teacher data suggest textbooks are most frequently used, more than 80% of the students either have a personal text, or borrow one. In math and sciences, where texts are least used according to teacher data, 75.9% and 81.9% of the students, respectively, do not have a textbook. However, Table 28 presents some important new information. Here student responses regarding their possession of a text are compared to their individual teachers' tendency to use texts. As one would expect, students in classes where teachers "always" use texts are more likely to have or borrow a text. However, what is important to note is that even in such classes where texts are heavily used, almost half (49.0%) of the students do not have access to a text. Such students are likely to be at a significant learning disadvantage.

Above we have noted that there is a slight tendency for teachers in primary as opposed to secondary schools to use textbooks

TABLE 26 - AVAILABILITY OF TEXTBOOKS BY STUDENTS

Textbook Availability	N	%
I have a textbook	348	36.8
I do not have a textbook	490	51.8
I borrow a textbook	94	9.9
No answer	14	1.5
Total	946	100.0

TABLE 27 - TEXTBOOK AVAILABILITY BY STUDENTS' SUBJECT

	Availability			
SUBJECT	YES	NO	BORROW	TOTAL
LANGUAGE	47.1% 164 66.6%	9.0% 44 17.9%	40.4% 38 15.4%	246
SOC. STUDIES	29.6% 103 51.5%	13.1% 64 32.0%	35.1% 33 16.5%	200
MATHEMATICS	17.0% 59 21.8%	41.8% 205 75.9%	6.4% 6 2.3%	270
SCIENCES	6.3% 22 10.7%	36.1% 177 81.9%	18.1% 17 7.9%	216
TOTAL	348	490	94	sig.=.01

TABLE 28 - STUDENTS WITH TEXTBOOKS ACCORDING TO TEACHERS WHO USE THEM

TEACHERS ASK FOR TEXTBOOKS	STUDENT'S TEXTBOOKS AVAILABILITY			
	YES	NO	BORROW	TOTAL
Teachers ask always	40.9% 283 81.3%	49.0% 339 69.2%	10.1% 70 74.5%	692
They never or sometimes ask	27.1% 65 18.7%	62.9% 151 30.8%	10.0% 24 25.5%	240
Total	348	490	94	sig.=.01

TABLE 29 - STUDENTS' TEXTBOOK AVAILABILITY BY TYPE OF SCHOOL

TEXTBOOK AVAILABILITY	PRIMARY PUBLIC	SECONDARY PUBLIC	TOTAL
YES	31.3% 109 26.9%	68.7% 239 45.4%	348
NO	47.8% 234 57.8%	52.2% 256 48.6%	490
BORROW	66.0% 62 15.3%	34.0% 32 6.1%	94
Total	405	527	sig. > .0001

more. Table 29 compares the student responses from the two types of schools. In spite of the fact that teachers in primary schools are more inclined to use texts, a substantially higher proportion of students in such schools do not have access to a textbook (57.8% vs. 48.6%). Students in primary schools are also much less likely to own a personal text and much more likely to borrow one. Secondary schools with 8th grade classes tend to serve a higher socio-economic clientele than do primary schools. What the several tables above suggest is that even in those cases, from the teacher data in a minority of classes, where teachers ask students to purchase texts and use them as a regular part of their pedagogy, a significant percentage of the students, primarily because of economic problems, do not have access to a textbook. To check this further, Table 30 examines student responses by the social class of the school. The categorization of

TABLE 30 - STUDENTS' TEXTBOOKS AVAILABILITY BY SOCIAL LEVEL OF THEIR SCHOOL

	Social Level of School		
TEXTBOOK AVAILABILITY	Low Middle Class	Middle and Upper Class	Total
YES	17.8% 62 26.8%	82.2% 286 40.8%	348
NO	24.9% 122 52.8%	75.1% 368 52.5%	490
BORROW	50.0% 47 20.3%	50.0% 47 6.7%	94
Total	231	701	sig. =.0001

schools is based upon the researcher's judgement of the neighbourhood and/or clientele served by the school and there is a fair amount of variation in the SES of individual students within any given school. While there is no difference in the percentage of students in the two types of schools who do not have a text, students in the lower status schools are less likely to own their own text and more likely to borrow a text.

We turn next to an examination of how students perceive textbooks. One assumes that these attitudes are the product not simply of their experience in the particular class included in this 8th grade sample, but of all of their experience throughout the primary years. As Table 31 indicates, generally students have a very positive perception

TABLE 31 - STUDENTS' OPINIONS REGARDING TEXTBOOKS

Student's answer	Textbooks are very useful	
YES	772	81.6%
NO	75	7.9%
NOT SURE	97	10.3%
NO ANSWER	2	0.2%

of textbooks. 81.6% considered textbooks as very useful. This contrasts sharply with the teacher attitudes reported above. (It also suggests that failure to have a text is not the result of dislike of texts or indifference toward them, but of lack of resources.) Student perceptions of textbook utility are presumably related to the ways in which textbooks are used. 46.4% of the students reported that they use textbooks when they do not understand what is taught by the teacher. As Table 32 shows, almost 2/3 of the students perceive that teachers use textbooks to help them understand the lesson being taught.

TABLE 32 - USE OF TEXTBOOKS BY TEACHERS, AS PERCEIVED BY STUDENTS

Student's answer	Teachers use textbooks to help understand lesson	
YES	580	61.3%
NO	204	21.6%
NOT SURE	155	16.4%

The generally positive interpretation of these student opinions must, however, be tempered by the results reported in Table 33. Here we find that only 28.2% of the students agree that "it is harder to understand with no textbooks", and half of the students disagree with that statement. We might conclude that these students generally tend to perceive textbooks as quite useful, but not absolutely necessary learning tools.

TABLE 33 - STUDENT OPINION REGARDING THE USEFULNESS OF TEXTBOOKS FOR UNDERSTANDING THE LESSON

Students' answer	It is harder to understand with no textbooks	
YES	267	28.2%
NO	477	50.4%
NOT SURE	196	20.7%
NO ANSWER	6	0.7%

Throughout these pages we have noted the consistent and strong differences in textbook utilization by subject area. It was considered important therefore to determine if student perceptions regarding textbook utility also vary by the subject area being studied. (While again bearing in mind that these perceptions are probably to some extent the product of a student's total experience with texts.) Table 34 specifies responses to the statement "textbooks are very useful" by subject area. Higher proportions of students in language

TABLE 34 - STUDENT OPINION ON USEFULNESS OF TEXTBOOKS, BY SUBJECT

	"TEXTBOOKS ARE VERY USEFUL"			
SUBJECT	NO	NOT SURE	YES	TOTAL
LANGUAGE	2.8% 7 9.3%	9.3% 23 23.7%	87.8% 217 28.1%	247
SOC. STUDIES	6.3% 13 17.3%	8.8% 18 18.6%	84.9% 124 22.5%	205
MATHEMATICS	6.2% 17 22.7%	14.7% 40 41.2%	79.1% 215 27.8%	272
SCIENCES	17.3% 38 50.7%	7.3% 16 16.5%	75.4% 166 21.5%	220
TOTAL	75	97	772	sig.>.0001

and social studies classes do indeed agree with this statement. However, it is also important to note that more than 3/4 of the students in math and science classes, where textbooks are seldom used, also agree that textbooks are very useful. Table 35 presents data which may be somewhat less "contaminated" by the students' previous experience with textbooks.

TABLE 35 - STUDENT USE OF TEXTBOOKS, BY SUBJECT

	USE OF TEXT WHEN DO NOT UNDERSTAND			
SUBJECT	NO	NOT SURE	YES	TOTAL
LANGUAGE	35.0% 71 47.7%	23.2% 47 52.2%	41.9% 85 41.1%	203
SOC. STUDIES	32.1% 45 30.2%	15.7% 22 24.4%	52.1% 73 35.3%	140
MATHEMATICS	30.3% 20 13.4%	21.2% 14 15.6%	48.4% 32 15.5%	66
SCIENCES	35.1% 13 8.7%	18.9% 7 7.8%	45.9% 17 8.2%	37
TOTAL	149	90	207	sig.>.0001

Students who had a text were asked whether they used it when they did not understand what the teacher had taught. The results are reported by subject area. Although the variations are statistically significant, what is most notable is that the differences across subject areas are not substantial. Whatever the subject area, around 40% to 50% of students who have texts will use them when they have trouble understanding what the teacher has presented, and about 1/3 will not resort to them for assistance. (Indeed it is interesting to observe that the proportion who use textbooks when they have trouble understanding the teacher is smallest--41.9%--in language classes, where textbook use is most common.) What is particularly important about these last results is that the use of a textbook to clarify what has not been understood from a teacher presentation is a student behaviour which is not dependent upon teacher behaviour--i.e., even if a teacher has not used a text at all in a particular lesson, the student can still take the book home and try to puzzle things out for him/herself.

In sum, then, students generally have a much more positive attitude toward textbooks than do teachers, and these students' perceptions vary much less across subject areas than do those of teachers. The main problems with respect to textbook availability and utilization relate to 1) teacher attitudes and 2) inability of students to purchase texts even when teachers wish to use them.

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APPENDIX I: VARIABLE DESCRIPTIONS

A number of variables are used as predictors in the analyses reported in the first two papers in this set. These are listed below. In cases where the nature of the variable is not self-evident, or where necessary explanation is not provided in the text, explanatory notes are provided.

Code for Appendix 2	Personal Characteristics of the Respondent
V1	1. Sex
V49	2. Occupational Aspirations - Subjects were asked what type of occupation they desired to have in 1983. The responses were coded into the same census categories used for classification of the respondents' first occupation (see text).
V3	3. Lives with spouse - Those living with a spouse were coded 2, others 1.
	4. Personal estimation of academic success - For each year in secondary school students were asked to estimate whether their grades were higher than, lower than, or around the average of the grades of all students in their class. The score represents the arithmetic mean of the responses for each year in which a student studied.
	5. Hours of free reading, 8th grade level and secondary level - In both the 1970 and 1977 questionnaires students were asked to estimate the number of hours per week they spent in reading for personal pleasure, not including comic books.
	Family and Community Characteristics
V50	1. Education of the respondent's father.
V54	2. Occupation of the respondent's father - The responses were coded into the same census categories used for classification of the respondent's first occupation (see text).
V57	3. Availability of TV in the home.
	4. Height - This variable is used as a proxy for malnutrition. Information regarding age, in years and months, and exact height were available for

all subjects in the 8th grade sample. Using the research of an eminent Chilean investigator of childhood malnutrition, F. Monckeberg, it was possible to establish for each sex and for half-year age intervals, a height level such that scores below it were highly likely to indicate significant malnutrition. Heights above that level were coded 2, those below it 1.

5. Direct stimulus of parents - Students were asked a series of questions regarding the interest and help received from their parents in schoolwork. The responses were combined, using weights derived from factor analysis, to form a single score.

V2 6. Lived in city or country when young - City coded as 2, country as 1.

7. Level of urbanization of province where now living - Provinces were scored according to the percentage of their population living in urban areas.

Educational Characteristics

V53 1. Last school year entered or completed - (called "educational attainment" in paper 1.) - Coding ranges from 1 = completed 8th grade to 6 = entered university.

V52 2. Year left school - ranges from 1970 to 1977.

V56 3. Individual 8th grade test score - (called "educational achievement" in paper 1.) - These are scores for each respondent on a national 8th grade test, which was taken by this cohort of students in 1970. The test consisted of two parts (50 questions each) assessing verbal and mathematical achievement.

V61 4. 8th grade test score class average - The average of the individual test scores for all of the respondents in each class in the original 1970 sample.

V58 5. Pre-service training of 8th grade teachers - 8th grade teachers were asked to indicate the level of their pre-service training on a five-point scale, ranging from incomplete normal school to a university degree in pedagogy. These scores were then averaged for all of a student's 8th grade teachers (at the 8th grade level there are different teachers for the different subject areas included in the curriculum).

6. Education of parents of 8th grade teachers. - 8th grade teachers were asked to indicate the level of education attained by their parents. These scores were then averaged for all of a student's teachers.

V60 7. Pedagogical excellence of the 8th grade school - This is a complex variable derived from factor analysis. It includes measures of such teaching-learning facilities and characteristics as laboratories, workshops, library, and various kinds of specialized teaching personnel. Scores are scaled to have a mean of 0 and a range of -1.0 to +1.0.

V59 8. 8th grade class size.

9. Average size of secondary class.

V4 10. School type 1971 - Coded as follows for regression analysis: Liceo = 3, Commercial = 2, Other = 1.

11. Textbook availability 8th grade. Responses to a series of questions regarding textbook availability by subject at the 8th grade level were weighted and averaged using a scaling program (with scores scaled to have a mean of 0 and a range of -1.0 to +1.0) which produced a single score for each student.

Text 12. Textbook availability at the secondary level - All respondents were asked whether they had a textbook for personal use, and whether the professor had required a text, in each academic subject they studied in each year in which they were in school. In cases where the professor asked for a text, they were coded 2 if they had a text, 1 if not. The score is the arithmetic mean of the responses for all subjects and years studied.

13. Personal estimation of lack of academic problems. Students were asked to indicate whether during their secondary schooling they had encountered any of a variety of specific academic obstacles (e.g., inability to understand or get along with particular subject matter teachers). A high score indicates a lack of such problems.

V62 14. Number of non-formal courses related to work.

V51 15. Number of non-formal courses not related to work - Detailed information was gathered with respect to each non-formal educational experience in which respondents engaged. Data regarding the nature of the course itself, and the reasons cited for taking it, were used to classify them into those clearly related to work, and those not so related.

Appendix 2
Correlation Matrices
for Tables 8 and 9

Males

	V54	V49	V50	V2	V53	V59	V51	Text	V61	V4	V60
V54	1.00	.40	.33	.24	.38	.20	.30	.33	.20	.33	.36
V49		1.00	.16	.26	.34	.22	.07	.23	.11	.17	.09
V50			1.00	.25	.33	.17	.18	.38	.30	.33	.39
V2				1.00	.18	.32	.16	.16	.16	.09	.24
V53					1.00	.19	.15	.54	.15	.22	.28
V59						1.00	.10	.24	.08	.08	.17
V51							1.00	.12	.21	.11	.30
Text								1.00	.21	.22	.29
V61									1.00	.15	.42
V4										1.00	.31
V60											1.00

Females

	V54	V49	V3	V57	V50	V2	V53	V4	Text	V60	V58
V54	1.00	.19	-.19	.32	.34	.19	.38	.33	.27	.30	.21
V49		1.00	-.00	-.11	.06	.17	.15	.12	.11	-.03	.04
V3			1.00	.03	-.12	.04	-.25	-.09	-.14	-.09	-.19
V57				1.00	.27	.11	.07	.05	.08	.16	.13
V50					1.00	.26	.34	.27	.36	.34	.35
V2						1.00	.13	.03	.16	.11	.30
V53							1.00	.05	.53	.26	.24
V4								1.00	.24	.26	.24
Text									1.00	.21	.21
V60										1.00	.39
V58											1.00

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Spanish: La lucha contra la pobreza rural: el aporte de la educación no formal. *Editorial Tecnos, 1975.*

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Cost-Benefit Analysis in Education: A Case Study of Kenya
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This book complements earlier studies by reviewing existing literature on the relation between farmer education and farm efficiency. The authors then are able to confirm these earlier findings—which strongly suggest that the more educated farmers are more productive, particularly where new inputs and methods are available—by using new techniques to examine new data sets from Korea, Malaysia, and Thailand. Price data from Thailand are used to test the effect of education on the ability of a farmer to adjust the prices and composition of his output to the prevailing prices.

The Johns Hopkins University Press, 1982. 310 pages (including bibliography, appendixes, index).

LC 81-47612. ISBN 0-8018-2575-X, $27.50 hardcover.

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World Bank Staff Working Paper No. 440. November 1980. 129 pages (including references, tables).

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Public Expenditures on Education and Income Distribution in Colombia
Jean-Pierre Jallade

Examines the allocation of educational benefits among various population groups and considers the distributional effects of taxes that pay for public subsidies in general.

The Johns Hopkins University Press, 1974. 90 pages (including 2 annexes, bibliography).

LC 74-4216. ISBN 0-8018-1628-9. $5.00 (£3.00) paperback.

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